Configuring Line Services

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Site Manager Software Version 4.0

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Bay Networks

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Contents

About This Guide

Audience xviii
Before You Begin xviii
Bay Networks Customer Support xviii
CompuServe xix
InfoFACTS xx
World Wide Web xx
How to Get Help xx
Conventions xxi
Ordering Bay Networks Publications xxi
Acronyms xxii

Chapter 1
Overview of Line Protocols

LAN Protocols 1-1
Ethernet Overview 1-1
Ethernet Topologies 1-1
Data Flow 1-3
Medium Access Control 1-3
Ethernet Frame Formats 1-3
Ethernet Media 1-4
Token Ring Overview 1-5
Token Ring Topology 1-5
Data Flow and Medium Access Control 1-6
FDDI Overview 1-6
FDDI Dual Counter-Rotating Ring Architecture 1-7
FDDI Ring Operation 1-9
FDDI Ring Maintenance 1-10
FDDI SMT 1-10

Wide Area Circuits 1-13
T1 Services 1-13
T1 Signals 1-13
T1 Synchronization 1-14
T1 Frame Format 1-15
E1 Services 1-17
WAN Protocols 1-18

Chapter 2
Accessing Line Services

Accessing a Line 2-1
Editing Line Details 2-5

Chapter 3
Customizing Line Protocols

Editing E1 Line Details 3-2
Editing Ethernet Line Details 3-6
Configuring the CSMA/CD Automatic Negotiation Protocol 3-10
Editing FDDI Line Details 3-15
Editing FDDI Advanced Attributes 3-18
Editing FDDI SMT Attributes 3-18
Editing FDDI MAC Attributes 3-24
Editing FDDI Path Attributes 3-25
Editing FDDI Port Attributes 3-28
Editing HSSI Line Details 3-30
Editing T1 Line Details 3-34
Editing Token Ring Line Details 3-38
Editing ATM Line Details 3-41
Editing ATM FRE2 Line Details 3-41
Editing ATM Physical Attributes 3-45
Editing ATM ARE Line Details 3-47

Chapter 4
Customizing Synchronous and Asynchronous Lines

Editing Synchronous Line Details 4-2
Point-to-Point Addresses 4-18
KG84A Support 4-19
Editing LAPB Protocol Parameters 4-23
Editing Asynchronous Line Details 4-29

Chapter 5
Configuring MCE1

Adding MCE1 Circuits 5-1
Setting Clock Parameters 5-2
Selecting the Port Application 5-5
Configuring the MCE1 Port 5-7
Configuring Non-PRI Circuits 5-10
Adding Circuits for and Defining Logical Lines 5-11
Grouping Lines into a Multiline Circuit 5-15
Configuring the Logical Line 5-20
Assigning Timeslots 5-26
Saving Your Changes 5-28
Configuring MCE1 ISDN PRI Circuits 5-28
Assigning Timeslots 5-30
Editing the B-Channel Logical Line Parameter 5-30
Saving Your Changes 5-31
Testing MCE1 Lines 5-31
Setting the Test Parameters 5-32
Running the Tests 5-36

Chapter 6
Configuring MCT1

Adding MCT1 Circuits 6-2
Setting Clock Parameters for MCT1 Lines Other Than QMCT1 Lines 6-3
Selecting the Port Application 6-5
Setting Clock Parameters for QMCT1 Lines 6-6
Editing the Clock Parameters for QMCT1 6-8
Setting MCT1 Port Parameters 6-8

Configuring Non-PRI Circuits 6-15
Adding Circuits for and Defining Logical Lines 6-16
Grouping Lines into a Multiline Circuit 6-19
Configuring the Logical Line 6-24
Assigning Timeslots 6-30
Saving Your Changes 6-32
Configuring MCT1 ISDN PRI Circuits 6-33
Assigning Timeslots 6-34
Editing the B-Channel Logical Line Parameters 6-35
Saving Your Changes 6-35
Testing MCT1 Lines 6-36
Testing All Lines Associated with a Port 6-36
Setting the Test Parameters 6-36
Running the Tests 6-41
Testing Individual Logical Lines (QMCT1 Only) 6-43
Setting Test Parameters 6-44
Running the Tests 6-46

Chapter 7
Configuring Multiline Services

Overview of Multiline Configurations 7-1
Types of Multiline Circuits 7-2
Grouping Data Paths 7-3
Multiline Traffic Distribution 7-4
Address-based Selection 7-4
Random Selection 7-5
Frame Relay Considerations 7-5
PPP Multilink 7-5
Bandwidth-on-Demand (BOD) 7-6
Configuring Multiline 7-6
Grouping Physical Synchronous Lines into a Multiline Circuit 7-6
Adding Physical Synchronous Lines to a Circuit 7-8
Changing the Traffic Distribution Method 7-10

Chapter 8
Managing Line Resources

Overview of Line Resource Management Services 8-2
Line Resource Manager (LRM) 8-2
Supported Media 8-3
How LRM Works with ST2 8-3
Enabling the Line Resource Manager 8-3
Accessing LRM on an MCT1 Line 8-12
Disabling Line Resource Management 8-14
Removing a Line's Reservations 8-14
Deleting LRM Services 8-14

Appendix A
Site Manager Default Line Parameter Settings

E1 Line Parameters A-1
Ethernet Line Parameters A-1
FDDI Line Parameters A-2
HSSI Line Parameters A-3
T1 Line Parameters A-4
Token Ring Line Parameters A-4
ATM FRE2 Line Parameters A-4
ATM ARE Line Parameters A-5
Synchronous Line Parameters A-6
LAPB Parameters A-7
Asynchronous Line Parameters A-8
MCE1 Line Parameters A-9
MCT1 Line Parameters A-10
Multiline Parameters A-13
Line Resource Parameters A-13

Index

Figures

Figure 1-1. Ethernet LAN, Bus Topology 1-2
Figure 1-2. Ethernet LAN, Star Topology 1-2
Figure 1-3. Ethernet and 802.3 Message Formats 1-4
Figure 1-4. Token Ring LAN 1-5
Figure 1-5. Relationship of FDDI Standards 1-7
Figure 1-6. Failure of Corresponding Links on Both Rings 1-8
Figure 1-7. Failure of Node on Ring 1-8
Figure 1-8. Bipolar Format 1-14
Figure 1-9. Bipolar with 8-Zero Substitution 1-15
Figure 1-10. D4 Frame 1-16
Figure 1-11. Extended Superframe 1-17
Figure 2-1. Configuration Manager Window 2-2
Figure 2-2. Circuit List Window 2-3
Figure 2-3. Circuit Definition Window 2-4
Figure 2-4. Edit Lines Window 2-5
Figure 3-1. E1 Line Entry Window 3-2
Figure 3-2. Edit CSMA/CD Parameters Window 3-6
Figure 3-3. Edit 100 Mb/s CSMA/CD Parameters Window 3-7
Figure 3-4. Selecting Automatic Line Negotiation 3-11
Figure 3-5. Auto Negotiation Configuration Prompt 3-11
Figure 3-6. Auto Neg Advertising Capabilities Window 3-12
Figure 3-7. Auto Negotiation State Information Window 3-13
Figure 3-8. Edit FDDI Parameters Window 3-15
Figure 3-9. FDDI Advanced Attributes Window 3-18
Figure 3-10. FDDI SMT Attributes Window 3-19
Figure 3-11. Default Connection Policy Status Word 3-21
Figure 3-12. FDDI MAC Attributes Window 3-24
Figure 3-13. FDDI Path Attributes Window 3-25
Figure 3-14. Example of Range of Values for Tvx Lower Bound 3-26
Figure 3-15. Example of Range of Values for T_Max Lower Bound 3-27

Figure 3-16. Example of Range of Values for Requested TTRT 3-28
Figure 3-17. FDDI Port Attributes Window 3-28
Figure 3-18. Edit HSSI Parameters Window 3-30
Figure 3-19. T1 Line Entry Window 3-34
Figure 3-20. Edit Token Ring Parameters Window 3-38
Figure 3-21. Edit ATM Connector Window 3-41
Figure 3-22. Edit ATM/ALC Parameters Window 3-42
Figure 3-23. ATM/ALC Physical Interface Attributes Window 3-45
Figure 3-24. ATM/ARE Line Driver Attributes Window 3-48
Figure 4-1. Edit SYNC Parameters Window 4-2
Figure 4-2. Satellite Broadcast (Sample Topology) 4-19
Figure 4-3. KG84A Network Configuration 4-20
Figure 4-4. Edit LAPB Parameters Window 4-24
Figure 4-5. Edit ASYNC Parameters Window 4-29
Figure 5-1. Configuration Manager Window with MCE1 in Slot 3 5-2
Figure 5-2. Edit Slot DS1/E1 Clock Parameters Window 5-3
Figure 5-3. Port Application Window 5-5
Figure 5-4. MCE1 Port Parameters Window 5-7
Figure 5-5. MCE1 Logical Lines Window before Defining a Circuit 5-11
Figure 5-6. Add Circuit Window 5-12
Figure 5-7. Default Circuit Name for MCE1 Link Modules 5-13
Figure 5-8. Default Circuit Name for ASN MCE1 Net Modules 5-13
Figure 5-9. MCE1 Logical Lines Window with One Circuit Defined 5-14
Figure 5-10. MCE1 Logical Lines Window with Unused Logical Lines 5-16
Figure 5-11. Circuit Definition Window 5-17
Figure 5-12. Select Logical Line Window 5-17
Figure 5-13. Selecting an Unused Logical Line 5-18
Figure 5-14. Selecting Change Lines from the Circuit Definition Window 5-19
Figure 5-15. MCE1 Logical Lines Window with a Multiline Circuit Defined 5-20
Figure 5-16. MCE1 Timeslots Window 5-26
Figure 5-17. Assigning a Timeslot 5-27
Figure 5-18. MCE1 PRI Logical Lines Window (ISDN PRI Configurations) 5-28
Figure 5-19. MCE1 Timeslots Window (ISDN PRI Configurations) 5-29
Figure 5-20. MCE1 Port Parameters Window in Dynamic Mode 5-32
Figure 5-21. MCE1 Port Actions Window 5-33

Figure 6-1. Configuration Manager Window with MCT1 in Slot 3 6-2
Figure 6-2. Edit Slot DS1/E1 Clock Parameters Window 6-3
Figure 6-3. Port Application Window 6-5
Figure 6-4. MCT1 Port Parameters Window 6-9
Figure 6-5. MCT1 Logical Lines Window before Defining a Circuit 6-15
Figure 6-6. Add Circuit Window 6-16
Figure 6-7. MCT1 Default Circuit Name 6-17
Figure 6-8. MCT1 Logical Lines Window with One Circuit Defined 6-18
Figure 6-9. MCT1 Logical Lines Window with Unused Logical Lines 6-20
Figure 6-10. Circuit Definition Window 6-21
Figure 6-11. Select Logical Line Window 6-21
Figure 6-12. Selecting an Unused Logical Line 6-22
Figure 6-13. Selecting Change Lines from the Circuit Definition Window 6-22
Figure 6-14. MCT1 Logical Lines Window with a Multiline Circuit Defined 6-23
Figure 6-15. MCT1 Timeslots Window 6-31
Figure 6-16. Assigning a Timeslot 6-32
Figure 6-17. MCT1 PRI Logical Lines Window 6-33
Figure 6-18. MCT1 Timeslots Window (ISDN PRI Configurations) 6-34
Figure 6-19. MCT1 Port Parameters Window in Dynamic Mode 6-37
Figure 6-20. MCT1 Port Actions Window 6-38
Figure 6-21. QMCT1 Port Actions Window 6-43
Figure 6-22. QMCT1 Logical Line Actions Window 6-44
Figure 7-1. Multiline Circuit Composed of Three Synchronous Lines 7-2
Figure 7-2. Multiline Circuit Types 7-3
Figure 7-3. Add Circuit Window 7-7
Figure 7-4. Circuit Definition Window 7-8
Figure 7-5. Change Lines Menu Option 7-9
Figure 7-6. Edit Multiline Options Window 7-10
Figure 8-1. Edit Connector Window 8-4
Figure 8-2. Creating the Line Resources Record 8-4
Figure 8-3. Edit Line Resources Window 8-5
Figure 8-4. MCT1 Port Parameters Window 8-12
Figure 8-5. MCT1 Logical Lines Window 8-13
Figure 8-6. Killing a Line's Reserved Resources 8-14
Figure 8-7. Deleting the CRM Line Resource Record 8-15

Tables

Table 1-1. SMT Frame Classes and Types 1-12
Table 1-2. Specification for T1 Line 1-13
Table 1-3. Specification for E1 Line 1-17
Table 1-4. WAN Protocols and Corresponding Books 1-18
Table 2-1. Site Manager Abbreviations for Circuit Types 2-3
Table 2-2. Line Types and Corresponding Chapters 2-5
Table 3-1. 100 Mb/s Ethernet Auto Negotiation State Information 3-14
Table 3-2. SMT Connection Policy Values 3-21
Table 5-1. Send Commands for BERT Mode 5-36
Table 6-1. Send Commands for BERT Mode 6-42
Table 6-2. Send Commands for BERT Mode 6-47
Table A-1. E1 Line Parameters A-1
Table A-2. Ethernet Line Parameters A-1
Table A-3. FDDI Line Parameters A-2
Table A-4. FDDI SMT Attribute Parameters A-2
Table A-5. FDDI MAC Attribute Parameters A-3
Table A-6. FDDI Path Attribute Parameters A-3
Table A-7. FDDI Port Attribute Parameters A-3
Table A-8. HSSI Line Parameters A-3
Table A-9. T1 Line Parameters A-4
Table A-10. Token Ring Line Parameters A-4
Table A-11. ATM FRE2 Line Parameters A-4
Table A-12. ATM FRE2 Physical Attribute Parameters A-5
Table A-13. ATM ARE Line Parameters A-5
Table A-14. Synchronous Line Parameters A-6
Table A-15. LAPB Parameters A-7
Table A-16. Asynchronous Line Parameters A-8
Table A-17. MCE1 Clock Parameters A-9
Table A-18. MCE1 Port Application Parameters A-9

Table A-19. MCE1 Port Parameters A-9
Table A-20. MCE1 Logical Line Parameters A-9
Table A-21. MCE1 Port Action Parameters A-10
Table A-22. MCT1 Clock Parameters (All Modules except QMCT1) A-10
Table A-23. MCT1 Port Application Parameters A-11
Table A-24. QMCT1 Clock Parameters A-11
Table A-25. MCT1 Port Parameters A-11
Table A-26. MCT1 Logical Line Parameters A-12
Table A-27. MCT1 Port Action Parameters A-12
Table A-28. QMCT1 Logical Line Action Parameters A-13
Table A-29. Multiline Parameters A-13
Table A-30. Line Resource Parameters A-13

About This Guide

If you are responsible for configuring and managing Bay Networks routers, read this guide to learn how to customize the Bay Networks router software to configure line services.

Configuring Line Services offers

- An overview of (Chapter 1)
  - — LAN protocols (Ethernet, Token Ring, and FDDI)
  - — T1 and E1 lines
  - — WAN protocols
- Instructions for accessing line services parameters (Chapter 2)
- Instructions for customizing line parameters for
  - — E1, Ethernet, FDDI, HSSI, T1, Token Ring, and ATM lines (Chapter 3)
  - — Synchronous and asynchronous lines (Chapter 4)
  - — MCE1 lines (Chapter 5)
  - — See for MCT1 lines (Chapter 6)
- Instructions for configuring multiline services (Chapter 7)
- Instructions for using the Line Resource Manager for ST2 traffic (Chapter 8)

Note: *Screen shots in this manual may vary according to the type of router and link or net module you are using.*

Audience

Written for system and network managers, this guide assumes that

- You have a working knowledge of Site Manager.
- You have a working knowledge of your network's physical layer components.

Before You Begin

Before using this guide, you must complete the following procedures:

- Connect the router to a network and create a pilot configuration file. For instructions, refer to one of the following guides:
  - *Quick-Starting Routers and BNX Platforms*
  - *Connecting ASN Routers and BNX Platforms to a Network*
  - *Connecting BayStack AN and ANH Systems to a Network*
  - *Configuring Routers*
- Retrieve the configuration file in local, remote, or dynamic mode. Make sure you are running the latest version of Bay Networks Site Manager and router software. For instructions, refer to one of the following guides:
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Conventions

arrow character (➔)	Separates menu and option names in instructions. Example: Protocols➔AppleTalk identifies the AppleTalk option in the Protocols menu.
bold text	Indicates text that you need to enter and command names in text. Example: Use the **dinfo** command.
italic text	Indicates variable values in command syntax descriptions, new terms, file and directory names, and book titles.
quotation marks (“ ”)	Indicate the title of a chapter or section within a book.
`screen text`	Indicates data that appears on the screen. Example: `Set Bay Networks Trap Monitor Filters`
vertical line (|)	Indicates that you enter only one of the parts of the command. The vertical line separates choices. Do not type the vertical line when entering the command. Example: If the command syntax is **show at routes** | **nets**, you enter either **show at routes** or **show at nets**, but not both.

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Acronyms

AMI	Alternate Mask Inversion
ANSI	American National Standards Institute
ATM	Asynchronous Transfer Mode
B8ZS	Bipolar with 8-Zero substitution
BERT	Bit Error Rate Test
BOFL	Breath of Life (message)
CRC	Cyclic Redundancy Check
CRM	Circuit Resource Manager
CSMA/CD	Carrier Sense Multiple Access with Collision Detection
CTS	clear to send
FDDI	Fiber Distributed Data Interface
FDL	Facility Data Link
HDLC	high-level data link control
HSSI	high-speed serial interface
IP	Internet Protocol
LAPB	Link Access Procedure Balanced
LRM	Line Resource Manager
MAC	Media Access Control
MAU	Multi-Station Access Unit
MCE1	Multichannel E1
MCT1	Multichannel T1
MIB	Management Information Base
MTU	Maximum Transmission Unit
NCP	Network Control Protocol
NLPID	Network Layer Protocol Identifier
NSAP	Network Service Access Point
OSPF	Open Shortest Path First
PCM	Physical Connection Management (FDDI)
PDU	protocol data unit
PHY	Physical Layer Protocol (FDDI)
PMD	Physical Layer Medium Dependent (FDDI)

PPP	Point-to-Point Protocol
PVC	permanent virtual circuit
QoS	Quality of Service
RIP	Routing Information Protocol
RMT	Ring Management (FDDI)
RTS	request to send
SAP	Service Access Point
SDH	Synchronous Digital Hierarchy
SMDS	Switched Multimegabit Data Services
SMT	Station Management (FDDI)
SNAP	Subnetwork Access Protocol
SNMP	Simple Network Management Protocol
SONET	Synchronous Optical Network
SR	source routing
ST2	Stream Protocol 2
SVC	switched virtual circuit
TCP/IP	Transmission Control Protocol/Internet Protocol
TTRT	Target Token Rotation Time

Chapter 1
Overview of Line Protocols

When you add a network interface to a Bay Networks router, you must specify the type of LAN or WAN circuit or *line* to which the interface will connect. This chapter provides background information on LAN and WAN circuits you can specify.

LAN Protocols

This section provides background information about the following LAN protocols:

- Ethernet
- Token Ring
- FDDI

Ethernet Overview

Ethernet is a 10-megabit/second (Mb/s) or 100-Mb/s LAN that uses the Carrier Sense Multiple Access with Collision Detection (CSMA/CD) protocol to control access to the physical wiring (*medium*).

Ethernet Topologies

Thick and thin Ethernet LANs use a bus topology, in which devices connect directly to the backbone (Figure 1-1) at both the physical and logical levels.

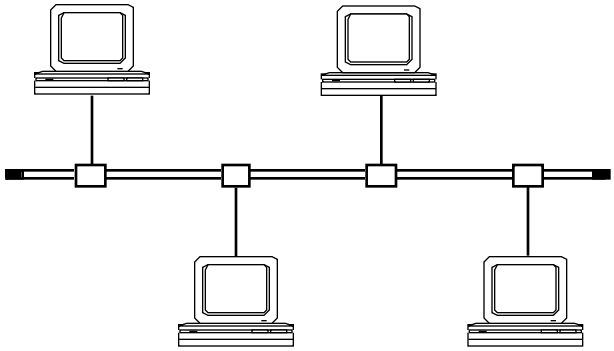

Figure 1-1. Ethernet LAN, Bus Topology

Physically, an Ethernet LAN using twisted-pair cable comprises a string of star topologies, in which devices connect to a central concentrator (Figure 1-2). Logically, however, the cabling still has a bus topology.

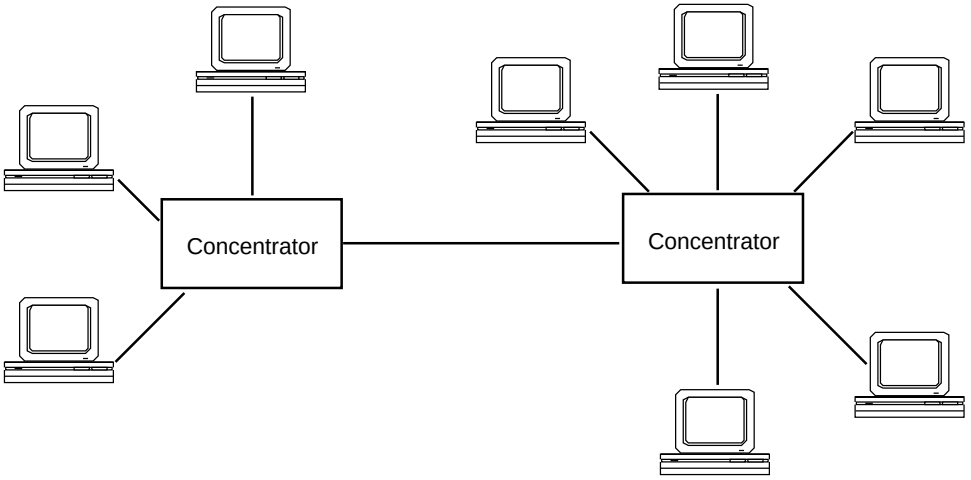

Figure 1-2. Ethernet LAN, Star Topology

Data Flow

When a node on an Ethernet LAN (*endstation)* transmits data, every endstation on the LAN receives the data. Each endstation checks each data unit to see whether the destination address matches its own address. If the addresses match, the endstation accepts and processes the packet. If they do not match, it disregards the packet.

Medium Access Control

Endstations use Carrier Sense Multiple Access with Collision Detection (CSMA/CD) to monitor the medium and wait until it is idle before transmitting data.

Carrier Sense Multiple Access

Before attempting to transmit a message, an endstation determines whether or not another endstation is transmitting a message on the medium. If the medium is available, the endstation transmits the message; if not, the endstation delays its transmission until the other endstation has finished sending.

Collision Detection

If two endstations transmit data simultaneously, a collision occurs and the result is a composite, garbled message. All endstations on the network, including the transmitting endstations, detect the collision and ignore the message. Each endstation that wants to transmit waits a random amount of time and then attempts to transmit again. The random transmission delays reduce the probability that the endstations will transmit simultaneously again.

Ethernet Frame Formats

There are two MAC-layer frame format specifications used in Ethernet LANs. The first specification is called Ethernet. The second, standardized by the IEEE, is called 802.3. One way that they differ is in message format (Figure 1-3). Instead of a Length field in the MAC-layer header, Ethernet messages include a Type field, indicating which higher-layer protocol is used in the Data field.

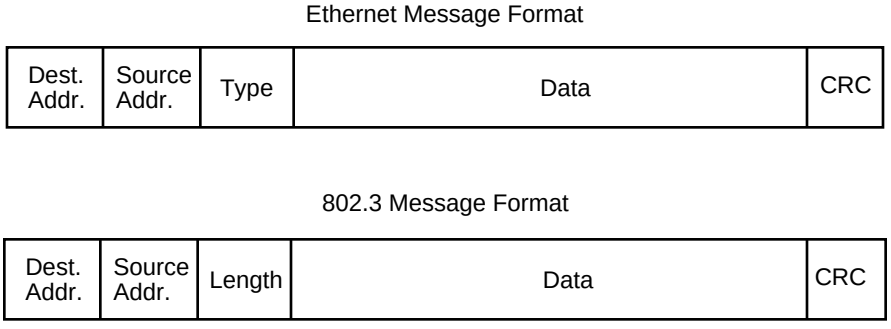

Figure 1-3. Ethernet and 802.3 Message Formats

Ethernet Media

A bisynchronous10-Mb/s Ethernet LAN (10Base-T) uses thick or thin Ethernet (coaxial cable) or Category 3 twisted-pair cable. A bisynchronous100-Mb/s Ethernet LAN (100Base-T, sometimes called *fast Ethernet*) uses three different media interfaces:

- 100Base-TX uses two pairs of unshielded twisted-pair wires and allows both full-duplex and half-duplex operation.
- 100Base-FX uses fiber cabling that supports half- and full-duplex operation.
- 100Base-T4 uses new physical-layer signals to run over four pairs of Category 3 unshielded twisted-pair wires. The signals use all four pairs, so only half-duplex operation is supported.

Currently, some vendors implement 100Base-T full-duplex operation with *congestion control*, a form of flow control, while others do not. You configure full-duplex operation with or without congestion control to be compatible with the remote equipment in your network.

Token Ring Overview

Token Ring is a 4-Mb/s or 16-Mb/s token-passing, baseband LAN that operates in a ring topology. Token Ring conforms to the IEEE 802.5 standard. A Token Ring LAN uses shielded or unshielded twisted-pair cable.

Token Ring Topology

Stations on a Token Ring network attach to the network using a Multi-Station Access Unit (MAU). Although the Token Ring is logically a ring, it is physically a star, with devices radiating from each MAU (Figure 1-4).

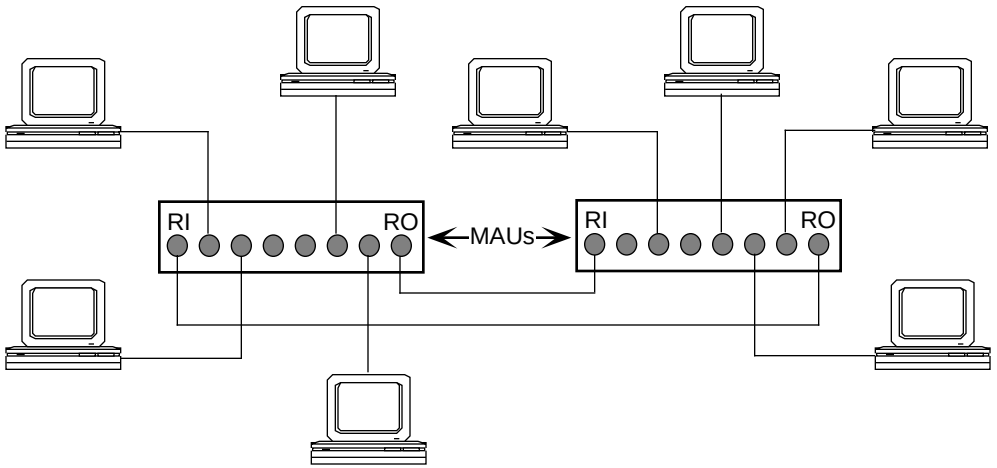

Figure 1-4. Token Ring LAN

MAUs connect a limited number of devices, typically 2, 4, or 8. You can extend the token ring by connecting the Ring Out (RO) port of one MAU to the Ring In (RI) port of the next (refer to Figure 1-4). You must complete the ring by connecting all RI and RO ports.

Data Flow and Medium Access Control

Devices on a Token Ring network get access to the media through token passing. Token and data pass to each station on the ring, as follows:

1. The devices pass the token around the ring until one of them needs to transmit data.
2. The device that wants to transmit takes the token and replaces it with a frame.
3. Each device passes the frame to the next device, until the frame reaches its destination.
4. As the frame passes to the intended recipient, the recipient sets certain bits in the frame to indicate that it received the frame.
5. The original sender of the frame strips the frame data off the ring and issues a new token.

FDDI Overview

Fiber Distributed Data Interface (FDDI) comprises a set of ANSI/ISO standards that define a 100-Mb/s, timed-token-passing LAN. FDDI is suitable for workgroup, backbone, and back-end network configurations that require high bandwidth and performance.

FDDI uses a dual counter-rotating ring topology for fault recovery and sophisticated encoding techniques to ensure data integrity. Up to 500 nodes can be connected per FDDI LAN. The FDDI standard specifies that the total length of the fiber-optic cabling used to connect the nodes may not exceed 200 km, or 100 km per ring.

The FDDI standards consist of the following entities:

- Physical Layer Medium Dependent (PMD)
- Physical Layer Protocol (PHY)
- Media Access Control (MAC)
- Station Management (SMT)

The PMD standard defines the physical characteristics of the media interface connectors and the cabling, and the services necessary for transmitting signals between nodes.

The PHY standard defines the rules for encoding and framing data for transmission, clocking requirements, and line states.

The MAC standard defines the FDDI timed-token protocol, frame and token construction and transmission on the FDDI ring, and ring initialization and fault isolation.

The SMT standard defines the protocols for managing the PMD, the PHY, and the MAC components of FDDI. The SMT protocols monitor and control the activity of each node on the ring.

Figure 1-5 shows the relationship of the four FDDI standards.

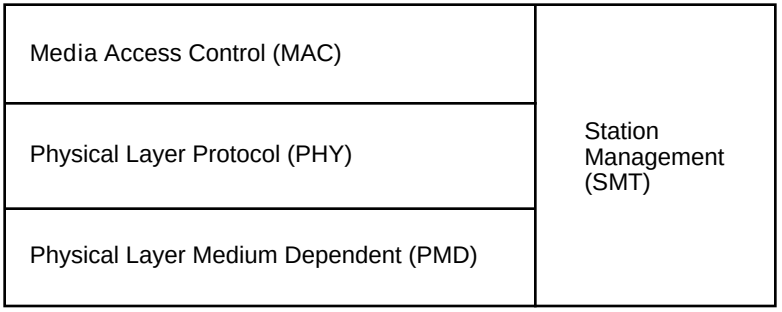

Figure 1-5. Relationship of FDDI Standards

FDDI Dual Counter-Rotating Ring Architecture

FDDI LANs comprise two independent, counter-rotating rings: a *primary* ring and a *secondary* ring. Data flows in opposite directions on the rings. Both rings can carry data; however, in high-bandwidth applications, Bay Networks specifies that the primary ring transmits data and the secondary ring is a backup device.

The counter-rotating ring architecture prevents data loss in the event of a link failure, a node failure, or the failure of both the primary and secondary links between any two nodes, as follows:

- If a link on the primary ring fails, the secondary ring transmits the data.
- If a node or corresponding links on both the primary and secondary rings fail, one ring wraps to the other around the faulty components, forming a single ring (Figures 1-6 and 1-7).

When the component can function again, the architecture reverts to dual-ring.

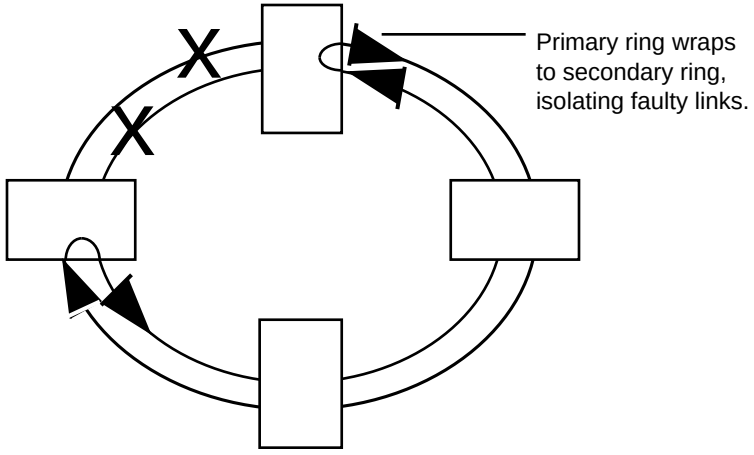

Figure 1-6. Failure of Corresponding Links on Both Rings

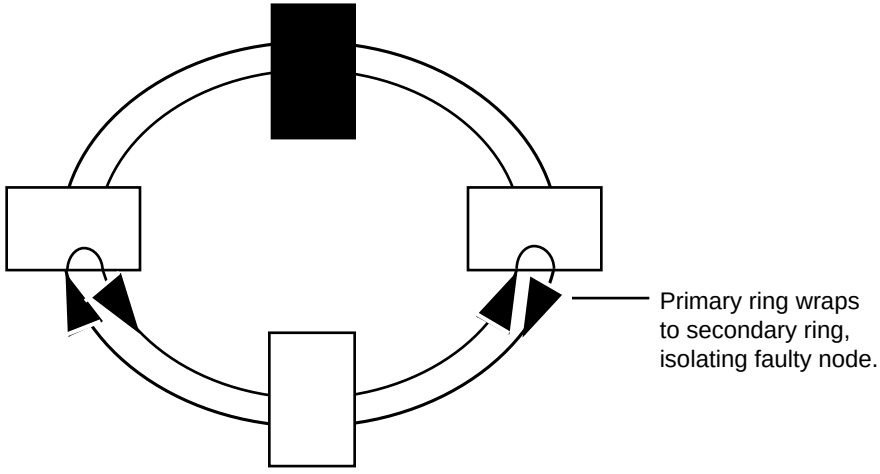

Figure 1-7. Failure of Node on Ring

FDDI Ring Operation

An FDDI ring consists of nodes in a ring architecture. There are two classes of nodes: *stations* (a node with no master ports), and *concentrators* (a node with master ports).

The FDDI standards define two types of stations: Single Attachment Stations (SAS) and Dual Attachment Stations (DAS). The SAS connects to only one ring; it cannot wrap the ring in case of a fault. The DAS connects to both the primary and secondary rings. The Bay Networks router is an example of a DAS.

FDDI initializes the ring and transmits data as follows:

1. The nodes on the ring establish connections with their neighbors.

   The Connection Management (CMT) portion of SMT controls this process, as described in "FDDI SMT," later in this chapter.

2. The nodes negotiate the target token-rotation time (TTRT), using the claim token process.

   The TTRT is the value that the MAC sublayer uses to time its operations. The claim token process determines which node initializes the ring (generates the token). The node with the lowest bid for the TTRT wins the right to generate the token.

3. After a node has initialized the ring, the ring begins to operate in steady state.

   In steady state, the nodes exchange frames using the timed-token protocol (TTP). The TTP defines how the TTRT is set, the length of time a node can hold the token, and how a node initializes the ring. The ring remains in steady state until a new claim token process occurs (for example, when a new node joins the ring).

4. The nodes pass the token from one node to another on the FDDI ring.

5. A node on the ring captures the token when it wants to transmit data, and then transmits data to its downstream neighbor.

6. Each node reads and repeats frames as it receives them. If a node detects an error in a frame, the node sets an error indicator.

7. A frame circulates on the ring until it reaches the node that first transmitted it. That node removes the frame from the ring.

8. When the first node has sent all of its frames, or exceeded the available transmission time, it releases the token back to the ring.

Station Timers

Each node uses three timers to regulate its operation in the ring:

- Token-rotation timer (TRT)
- Token-holding timer (THT)
- Valid transmission timer (TVX)

The TRT times the period between the receipt of tokens. TRT is set to varying values, depending on the state of the ring. During steady-state operation, the TRT expires when the actual token rotation time exceeds the TTRT.

The THT controls the length of time that a node can hold the token to transmit frames. The value of the THT is the difference between the arrival time of the token and the TTRT.

The TVX times the period between valid transmissions on the ring. When the node receives a valid frame or token, the TVX is reset. If the TVX expires, the node starts a ring initialization sequence to restore the ring to proper operation.

FDDI Ring Maintenance

Each node is responsible for monitoring the integrity of the ring. By using the TVX, nodes can detect a break in ring activity. If the interval between token receptions exceeds the value of the TVX, the node reports an error condition and initiates the claim process to restore ring operation.

If it cannot generate a token, the node that detected the problem initiates *beacon* frames. Beacon frames indicate to the other nodes that the ring is broken. If the beacon transmission exceeds the value set in the stuck-beacon timer (controlled by the Ring Management [RMT] portion of SMT), RMT attempts to restore the ring to normal operation.

If the ring does not return to normal operation in a specified period of time, RMT initiates a *trace*. A trace is a diagnostic function that isolates a fault on the ring. For more information about RMT, see the next section.

FDDI SMT

Bay Networks routers support Version 7.2 of the SMT protocol. SMT is a low-level protocol that manages the FDDI functions provided by the PMD, the PHY, and the MAC. SMT can run only on a single FDDI ring and can manage only the FDDI components and functions within a node.

SMT contains three components:

- Connection Management (CMT)
- Ring Management (RMT)
- SMT frame services

CMT

CMT performs these functions:

- Inserts and removes stations at the PHY level
- Connects PHYs and MACs with a node
- Uses trace diagnostics to identify and isolate a faulty component
- Manages the physical connection between adjacent nodes, including
  - Testing the quality of the link before establishing a connection
  - Establishing a connection
  - Monitoring link errors continuously when the ring is operational

RMT

RMT receives status information from the MAC and CMT, reporting this information to SMT and higher-level processes (for example, SNMP). It detects stuck-beacon conditions and duplicate addresses, and determines when the MAC is available for transmitting frames. Duplicate addresses prevent the proper operation of the ring.

SMT Frame Services

SMT frame services manage and control the FDDI network and the nodes on the network. Different SMT frame classes and types implement these services. *Frame class* identifies the function that the frame performs. *Frame type* specifies whether the frame is an announcement, a request, or a response to a request. FDDI SMT frames are limited to a single FDDI ring. The frames cannot move across wide area networks or across multiple FDDI rings. The frames do not manage functions outside FDDI.

Table 1-1 lists the SMT frames that Bay Networks routers support.

Table 1-1. SMT Frame Classes and Types

Frame Class	Frame Type
Neighbor Information Frames (NIF)	Request/Response
Status Information Frames (SIF)	Response
Echo Frames (ECF)	Response
Request Denied Frames (RDF)	Response
Status Report Frames (SRF)	Announcement
Parameter Management Frames (PMF) (PMF Get Response only)	Response

Neighbor Information Frames identify the upstream and downstream neighbors of each node. After the nodes learn the addresses of their upstream neighbors, you can use the addresses to create a logical map showing the order in which nodes appear in the token path. A Bay Networks station issues a response to the sender of a NIF frame and generates NIF requests as part of the neighbor notification process.

Status Information Frames exchange information about each node, including the status of each port on the node. You can use SIFs to create a physical map showing the position of each station in the FDDI network. There are two types of SIFs:

- SIF configuration frames, which show the configuration information of a node.
- SIF operation frames, which show the operational information of a node. A Bay Networks station issues a response to the sender of a SIF request frame.

Echo Frames verify that nodes on an FDDI network can communicate with each other. Echo frames are used to test connectivity only. A node sends an echo request (which is a directed packet) to another FDDI node. The receiver of the echo request copies the data that appears in the information field of the frame and transmits an echo response frame back to the originator of the echo request. A Bay Networks station issues a response to the sender of an echo request frame.

Request Denied Frames deny requests from the network. If the SMT agent receives a frame with an unsupported SMT version or an unknown frame type, it sends a Request Denied frame. A Bay Networks station issues an RDF Response frame.

Status Report Frames allow the Status Report protocol to report node conditions and events. A *condition* is when a node enters a specific state (for example, duplicate address detected). An *event* is an immediate occurrence (for example, the generation of a trace). A Bay Networks station issues an SRF announcement frame.

Parameter Management Frames allow the Parameter Management protocol to manage an FDDI node. A management station performs operations on the MIB attributes of a node by exchanging frames between the management station and the FDDI node. To obtain an attribute, the management station initiates a PMF Get Request frame. The FDDI node to which the PMF Get Request frame was sent responds by initiating a PMF Get Response frame. A Bay Networks station will issue a response to the sender of a PMF Get Request frame.

Wide Area Circuits

Wide area communications take place over several different types of circuits. This section describes the T1 and E1 digital services for WAN communications.

T1 Services

T1 services use digital signals to allow two pairs of wires to carry 24 voice or data transmissions. Table 1-2 shows the specification for a T1 line.

Table 1-2. Specification for T1 Line

Attribute	Value
Framing rate	8000 frames/s
Channels per frame	24
Line speed	1.544 Mb/s

T1 Signals

T1 uses bipolar format for signals. In bipolar format, alternating positive and negative pulses on the digital line signify the number one, and the absence of a pulse signifies zero (Figure 1-8). A negative pulse must always follow a positive pulse, and vice versa.

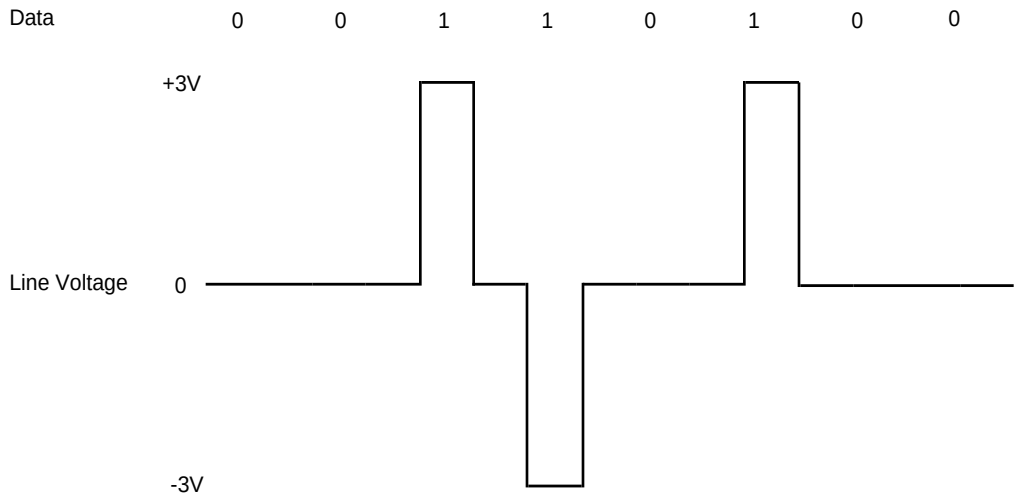

Figure 1-8. Bipolar Format

T1 Synchronization

A long string of zeros on a T1 line would cause the line to lose synchronization due to lack of pulses. Bay Networks offers Bipolar with 8-Zero Substitution (B8ZS) for T1 synchronization.

B8ZS substitutes a *bipolar violation* into a string of eight consecutive zeros at the transmitting end, and removes the bipolar violation at the receiving end. In a bipolar violation, the first pulse is in the same direction (positive or negative) as the previous data pulse (Figure 1-9).

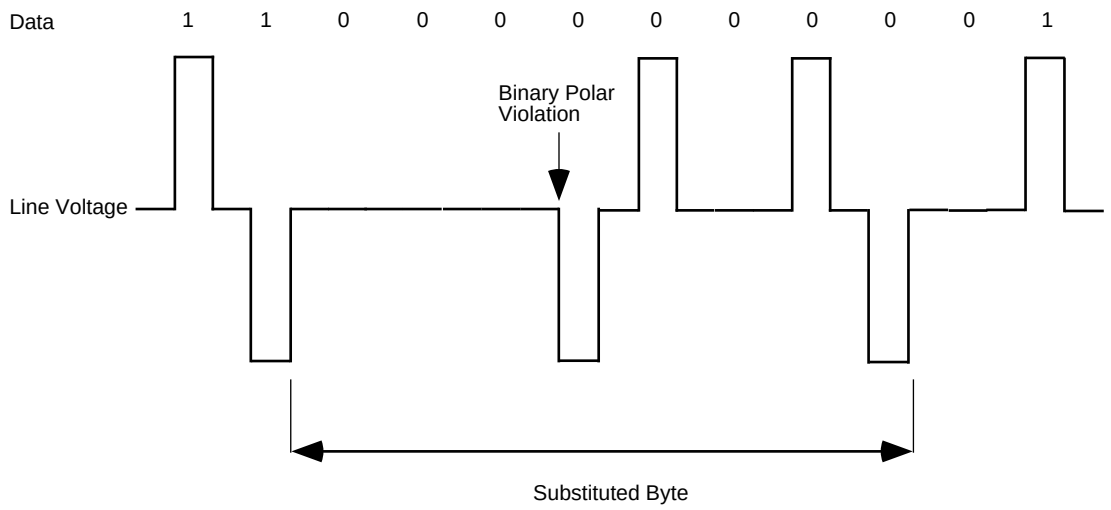

Figure 1-9. Bipolar with 8-Zero Substitution

T1 Frame Format

T1 uses two types of frame formats:

- D4
- Extended superframe (ESF)

D4

D4 is the original T1 frame format. A D4 frame (Figure 1-10) comprises

- One framing bit
- A *DS0 timeslot* for each channel on the line

  A DS0 timeslot is an 8-bit sample from a channel.

A T1 line generates 8000 D4 frames/second.

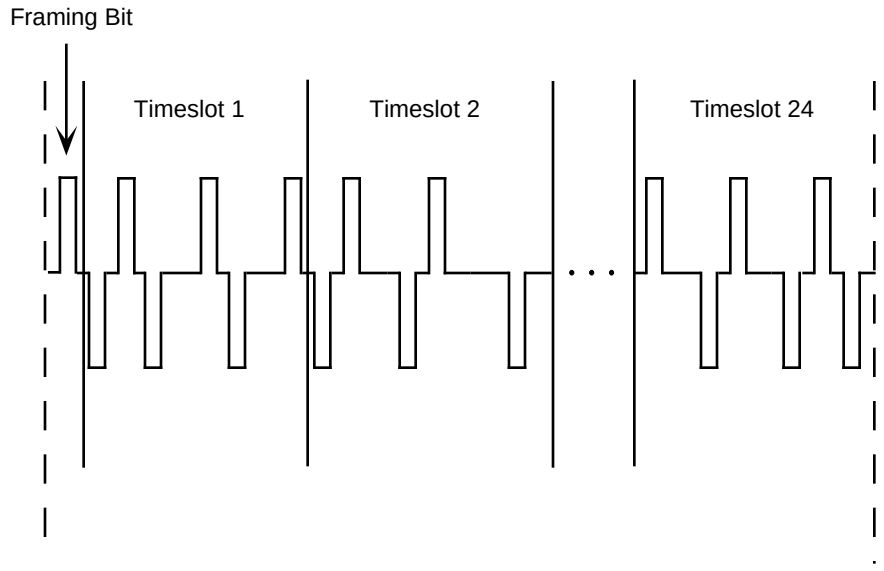

Figure 1-10. D4 Frame

ESF

The D4 format does not allow testing of a digital line while the line is in use. To allow such testing, you can use the extended superframe (ESF).

An ESF comprises 24 D4 frames (Figure 1-11). As each D4 frame contains a framing bit, an ESF has 24 framing bits that it uses for the following purposes:

- Synchronization (6 bits)
- Error checking (6-bit cyclic redundancy check)
- Diagnostic data channel (12 bits)

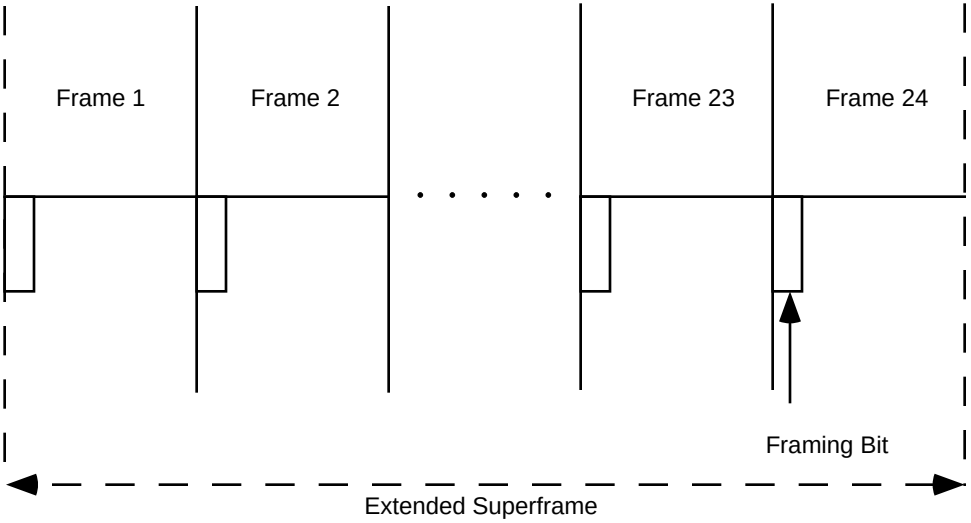

Figure 1-11. Extended Superframe

E1 Services

E1 services (2.048 CEPT) are the European equivalent of T1 services, and operate in a similar fashion. Table 1-3 shows the specification for an E1 line.

Table 1-3. Specification for E1 Line

Attribute	Value
Framing rate	8000 Frames/s
Channels per frame	32
Line speed	2.048 Mb/s

WAN Protocols

In addition to the circuitry used for wide area communications, a set of protocols govern the management of data across these circuits. These protocols are analogous to LAN protocols, such as Token Ring.

Table 1-4 lists WAN protocols and the Bay Networks guides that contain detailed information about each WAN protocol.

Table 1-4. WAN Protocols and Corresponding Books

WAN Protocol	Corresponding Book
Asynchronous Transfer Mode (ATM)	*Configuring ATM Services*
Frame Relay	*Configuring Frame Relay Services*
Point-to-Point Protocol (PPP)	*Configuring PPP Services*
Synchronous Data Link Control (SDLC)	*Configuring SDLC Services*
Switched Multimegabit Data Service (SMDS)	*Configuring SMDS Services*
X.25	*Configuring X.25 Services*

Chapter 2
Accessing Line Services

This chapter describes how to access line services. It assumes that you have read *Configuring Routers* and that you have

1. Opened a configuration file.
2. Specified router hardware if this is a local-mode configuration file.
3. Selected a router hardware module.
4. Configured a circuit on a connector.

Accessing a Line

To access a line you want to edit:

1. **Start at the Configuration Manager window (Figure 2-1).**

Note: *For many line protocols, you can bypass the following instructions by clicking on the configured connector in the Configuration Manager window and clicking on Edit Line at the prompt.*

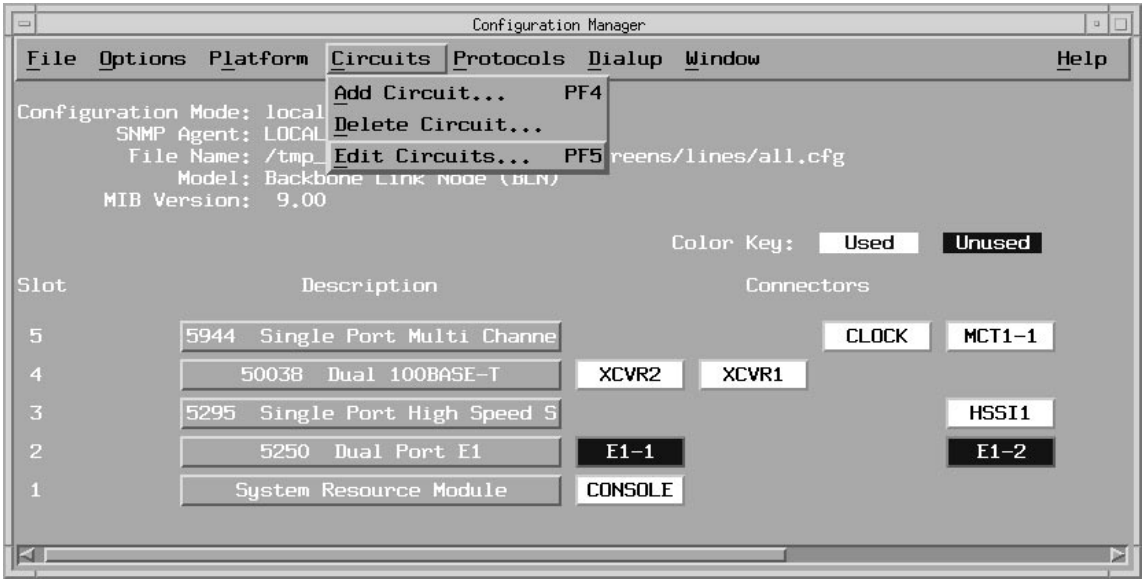
Configuration Manager
File Options Platform Circuits Protocols Dialup Window Help
Add Circuit... PF4
Delete Circuit...
Edit Circuits... PF5
Configuration Mode: local
SNMP Agent: LOCAL
File Name: /tmp_ reens/lines/all.cfg
Model: Backbone Link Node (BLN)
MIB Version: 9.00
Color Key: Used Unused
Slot Description Connectors
5 5944 Single Port Multi Channe CLOCK MCT1-1
4 50038 Dual 100BASE-T XCVR2 XCVR1
3 5295 Single Port High Speed S HSSI1
2 5250 Dual Port E1 E1-1 E1-2
1 System Resource Module CONSOLE

Figure 2-1. Configuration Manager Window

2. **Select Circuits→Edit Circuits.**

   The Circuit List window appears (Figure 2-2).

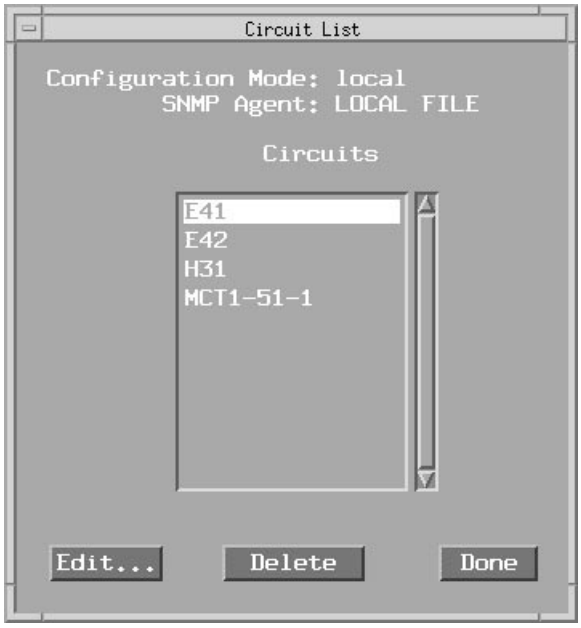

Figure 2-2. Circuit List Window

3. **Select the circuit for which you want to edit line service parameters.**

   Table 2-1 lists the default abbreviation for each circuit type.

Table 2-1. Site Manager Abbreviations for Circuit Types

Letter Designator	Circuit Type
E	Ethernet
E1	E1
F	FDDI
H	HSSI
MCE1	MCE1
MCT1	MCT1
O	Token Ring
S	Synchronous
T1	T1

4. **Click on Edit.**

   The Circuit Definition window appears.

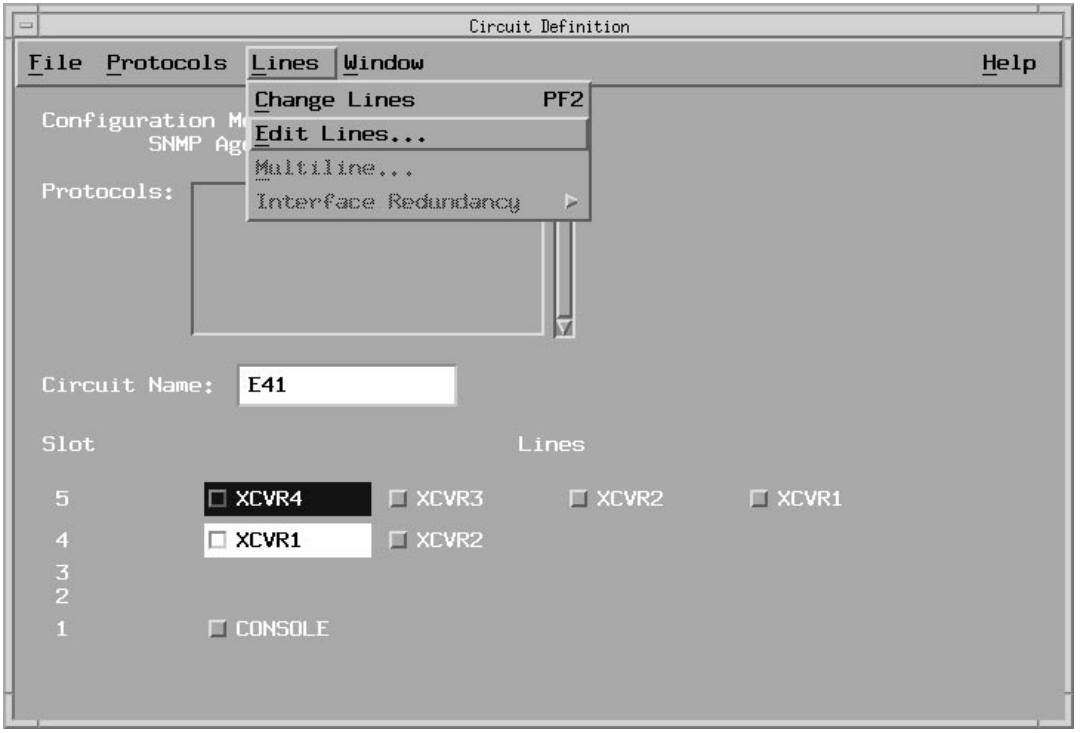

Figure 2-3. Circuit Definition Window

5. **Select Lines→Edit Lines.**

   The Edit Lines window appears (Figure 2-4). This window lists the existing lines by slot number and connector name.

Figure 2-4. Edit Lines Window

6. **Select the line you want to edit and click on Edit.**

   Depending on the type of circuit that you selected in Step 3, the Configuration Manager displays the window that allows you to modify the circuit's line details.

Editing Line Details

The type of line determines how you edit line details. Chapters 3 through 6 describe how to edit line detail parameters (Table 2-2).

Table 2-2. Line Types and Corresponding Chapters

Line Type	Chapter
Ethernet, E1, FDDI, HSSI, Token Ring, T1, ATM FRE2, ATM ARE	3
Synchronous or asynchronous	4
MCE1	5
MCT1	6

You need only read the sections that correspond to the circuits you are editing. See Appendix A for the default settings for all line parameters.

Chapter 3
Customizing Line Protocols

This chapter describes how to edit line details for the following physical-layer protocols:

- E1
- Ethernet
- FDDI
- HSSI
- T1
- Token Ring
- ATM FRE2
- ATM ARE

Before you can edit the line details, you must access line service parameters (refer to Chapter 2).

Note: *To edit synchronous and asynchronous line details, see Chapter 4. To edit Multichannel E1 (MCE1) lines, see Chapter 5. To edit Multichannel T1 (MCT1) lines, see Chapter 6.*

For each line parameter associated with these physical-layer protocols, this chapter provides information about default settings, valid parameter options, the parameter function, instructions for setting the parameter, and the MIB object ID.

The Technician Interface allows you to modify parameters by issuing **set** and **commit** commands with the MIB object ID. This process is equivalent to modifying parameters using Site Manager. For more information about using the Technician Interface to access the MIB, refer to *Using Technician Interface Software.*

Caution: *The Technician Interface does not verify that the value you enter for a parameter is valid. Entering an invalid value can corrupt your configuration.*

Editing E1 Line Details

If the line you select to edit is an E1 line, the Configuration Manager displays the E1 Line Entry window (Figure 3-1).

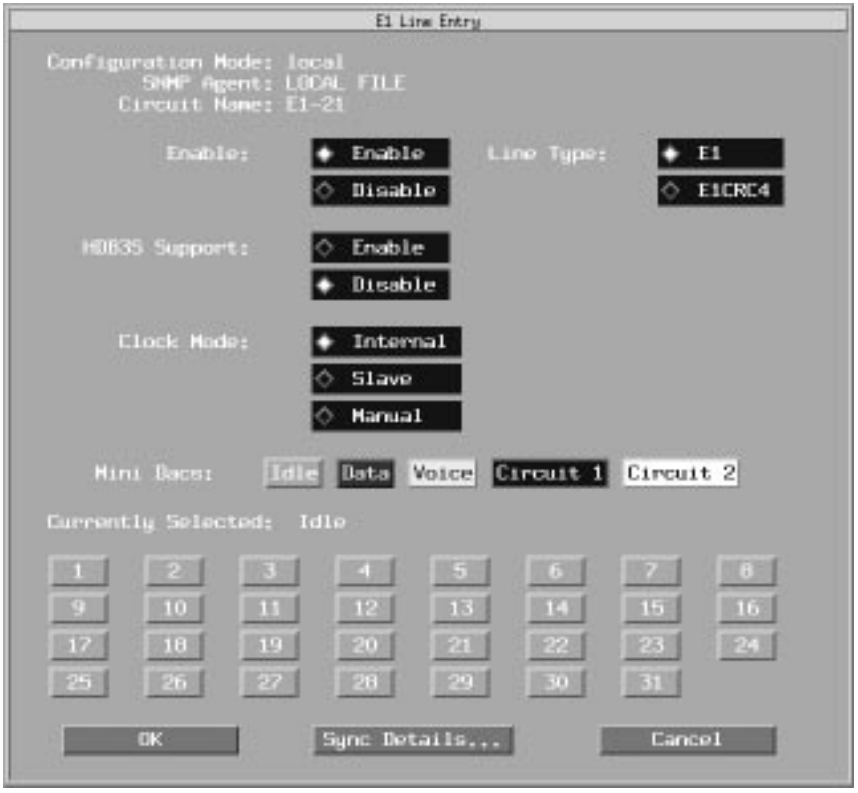

Figure 3-1. E1 Line Entry Window

To edit the E1 line parameters:

1. **Select values for the E1 line service parameters that you want to edit.**

   Refer to the descriptions following this procedure for guidelines.

2. **If you want to edit synchronous line parameters, click on Sync Details.**

   Refer to Chapter 4 for instructions.

3. **Click on OK.**

Parameter:	**Enable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables the E1 line.
Instructions:	Set to Disable if you want to disable the E1 line.
MIB Object ID:	1.3.6.1.4.1.18.3.4.11.1.2

Parameter:	**Line Type**
Default:	E1
Options:	E1 | E1CRC4
Function:	Enables or disables a 4-byte Cyclic Redundancy Check (CRC) on received frames.
Instructions:	Select E1CRC4 if the E1 equipment expects a 4-byte CRC trailer at the end of each frame.
MIB Object ID:	1.3.6.1.4.1.18.3.4.11.1.18

Parameter: **HDB3S Support**

Default: Disable

Options: Disable | Enable

Function: Enables or disables High-Density Bipolar Coding (a mechanism to maintain sufficient 1s density within the E1 data stream).

Instructions: Enable or disable this parameter, depending on the ability of the associated E1 equipment to support HDB3S.

MIB Object ID: 1.3.6.1.4.1.18.3.4.11.1.7

Parameter: **Clock Mode**

Default: Internal

Options: Internal | Slave | Manual

Function: Specifies the source of the E1 transmit clock, as follows:

Internal	Indicates that the router sets the clock.
Slave	Indicates that the incoming data stream sets the clock.
Manual	Indicates that jumpers on the E1 link module set the clock. (Refer to *Installing and Maintaining BN Routers* or *Installing and Maintaining ASN Routers and BNX Platforms* for information on link module hardware configuration.)

Instructions: Select the clocking mode, making certain that the associated E1 equipment is compatible.

MIB Object ID: 1.3.6.1.4.1.18.3.4.11.1.8

Parameter: **Mini Dacs**

Default: Idle

Options: Idle | Data | Voice | Circuit 1 | Circuit 2

Function: Assigns a specific function to each E1 channel, as follows:

Idle	Makes the channel idle
Data	Assigns the channel to data passthrough (E1 connector to E1 connector)
Voice	Assigns the channel to voice passthrough (E1 connector to E1 connector)
Circuit 1	Assigns the channel to the first E1 connector
Circuit 2	Assigns the channel to the second E1 connector

Instructions: Assign the appropriate function to the E1 channels.

To enable data and voice passthrough, assign identical channels to data or voice on both E1 connectors. For example, if the first E1 connector allocates Channels 2 through 8 to voice passthrough and Channels 9 through 16 to data passthrough, the second E1 connector must also allocate Channels 2 through 8 to voice passthrough, and Channels 9 through 16 to data passthrough.

You cannot allocate E1 channels to both E1 circuits. For example, if you allocate Channels 17 through 25 to Circuit 1 on the first E1 connector, you must make these channels idle or allocate them to Circuit 2 on the second E1 connector.

MIB Object ID: 1.3.6.1.4.1.18.3.4.11.1.9

Editing Ethernet Line Details

If the line you select to edit is a 10-Mb/s Ethernet line, the Configuration Manager displays the Edit CSMA/CD Parameters window (Figure 3-2). If you select a 100-Mb/s Ethernet line, the Edit 100Mb/s CSMA/CD Parameters window appears (Figure 3-3).

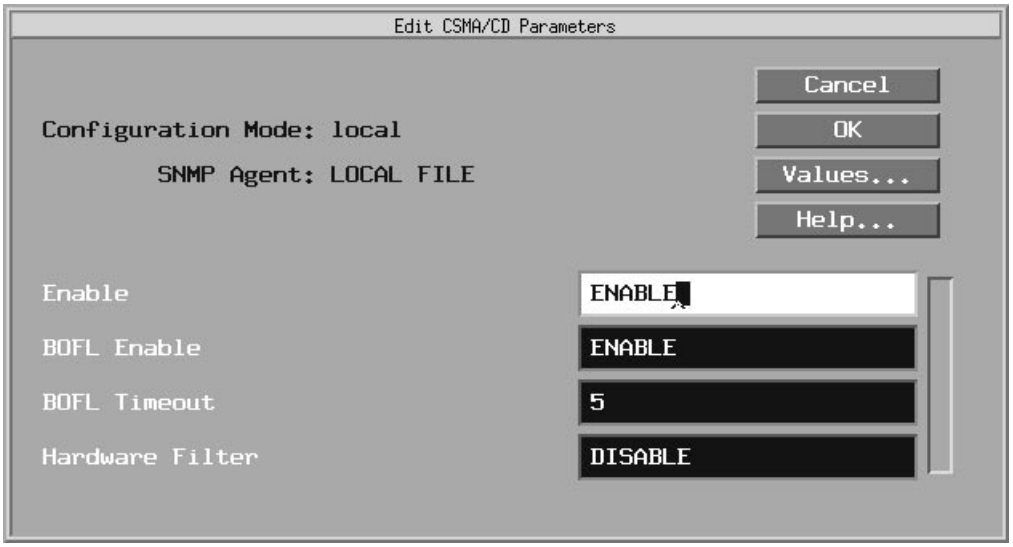

Figure 3-2. Edit CSMA/CD Parameters Window

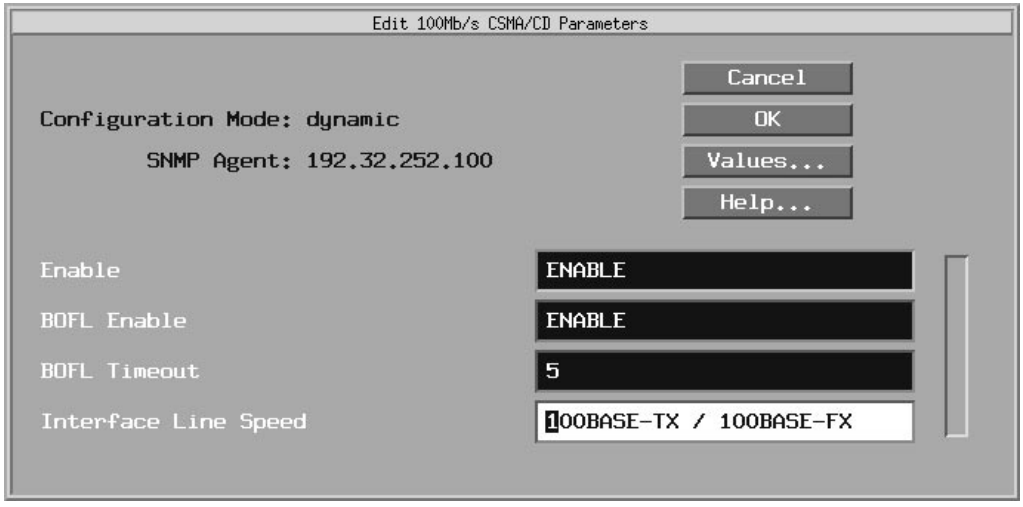

Figure 3-3. Edit 100 Mb/s CSMA/CD Parameters Window

To edit Ethernet line details:

1. **Enter or select new values for the CSMA/CD line detail parameters you want to edit.**

   Refer to the parameter descriptions following this procedure for guidelines.

2. **Click on OK.**

   If you select AUTO NEGOTIATION as the Interface Line Speed value, refer to “Configuring the CSMA/CD Automatic Negotiation Protocol” for information.

Parameter:	**Enable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables this Ethernet line.
Instructions:	Select Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.1.1.2

Parameter:	**BOFL Enable**
Default:	Enable
Options:	Enable | Disable
Function:	When set to Enable, the router sends Breath of Life polling messages from this system to all systems on the local network. These messages signify that the Ethernet line is up and functioning normally.
Instructions:	Set to Enable or Disable, depending on whether you want this system to broadcast Breath of Life messages over this line. We recommend that you enable BOFL.
MIB Object ID:	1.3.6.1.4.1.18.3.4.1.1.7

Parameter:	**BOFL Timeout**
Default:	5 seconds
Range:	1 to 60 seconds
Function:	Specifies the time between transmissions of Breath of Life messages from this Ethernet interface. Timeout will occur if five periods elapse without a successful BOFL message transmission. When timeout occurs, the router disables and re-enables the Ethernet interface. For example, if you set this parameter to 5 seconds, the interface must successfully transmit a BOFL message within 25 seconds. Timeout occurs in 25 seconds. This parameter is valid only if you set BOFL Enable to Enable.
Instructions:	Accept the default BOFL timeout of 5 seconds, or specify a new value up to 60 seconds.
MIB Object ID:	1.3.6.1.4.1.18.3.4.1.1.8

Parameter:	**Interface Line Speed**
Default:	100BASE-TX / 100BASE-FX
Options:	AUTO NEGOTIATION | 100BASE-TX / 100BASE-FX | 100BASE FD (Full Duplex) | 100BASE FD w/ Cong Control
Function:	Specifies the configured line speed and duplex setting for the selected interface, or enables automatic line negotiation.
Instructions:	To enable automatic line negotiation, select AUTO NEGOTIATION. To configure a specific line speed, select 100BASE-TX / 100BASE-FX (half-duplex over either twisted-pair or fiber cabling), 100BASE FD (full-duplex without congestion control), or 100BASE FD w/ Cong Control (full-duplex with congestion control). Selecting a specific line speed configuration disables AUTO NEGOTIATION. (Note that full-duplex support negotiated automatically is without congestion control.)
MIB Object ID:	1.3.6.1.4.1.18.3.4.16.1.1.4

Parameter:	**Hardware Filter**
Default:	Disable (the default changes to Enable when you add a circuit and reply OK to the prompt `Do you want to enable Hardware Filters on this circuit?`)
Options:	Enable | Disable
Function:	Enables filtering hardware in the link module to drop local frames at the interface instead of copying them into system memory. Local frames contain both destination and source MAC addresses that the router has learned on the interface. The bridge software teaches the hardware filter which MAC addresses are local to an interface. To drop a frame, the hardware filter must have already learned its destination and source addresses from the bridge software. Otherwise, the router copies the frame into system memory and the bridge software processes the frame.
Instructions:	Set to Enable only if you enabled the bridge and the link module has access to hardware filters. Enabling hardware filters improves bridging software performance because router resources are not used to receive and reject local frames.
MIB Object ID:	1.3.6.1.4.1.18.3.4.1.1.29

Parameter:	**Interface Line Speed**
Default:	100BASE-TX / 100BASE-FX
Options:	AUTO NEGOTIATION | 100BASE-TX / 100BASE-FX | 100BASE FD (Full Duplex) | 100BASE FD w/ Cong Control
Function:	Specifies the configured line speed and duplex setting for the selected interface, or enables automatic line negotiation.
Instructions:	To enable automatic line negotiation, select AUTO NEGOTIATION. To configure a specific line speed, select 100BASE-TX / 100BASE-FX (half-duplex over either twisted-pair or fiber cabling), 100BASE FD (full-duplex without congestion control), or 100BASE FD w/ Cong Control (full-duplex with congestion control). Selecting a specific line speed configuration disables AUTO NEGOTIATION. (Note that full-duplex support negotiated automatically is without congestion control.)
MIB Object ID:	1.3.6.1.4.1.18.3.4.16.1.1.4

Configuring the CSMA/CD Automatic Negotiation Protocol

When you configure a 100-Mb/s line for automatic line negotiation, the Configuration Manager prompts for additional information.

1. **With the Interface Line Speed parameter set to AUTO NEGOTIATION, click on OK (Figure 3-4).**

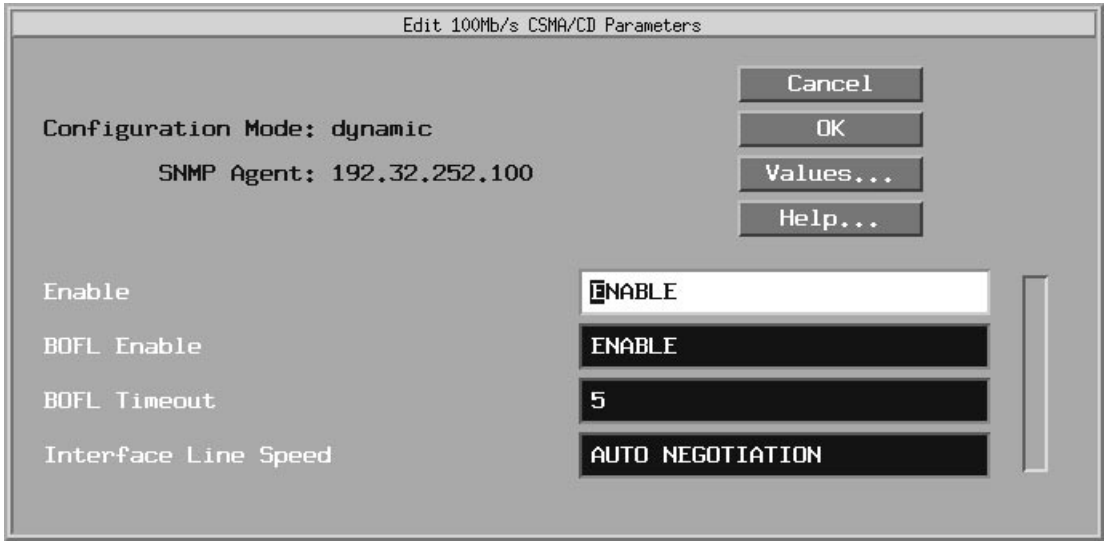

Figure 3-4. Selecting Automatic Line Negotiation

The Auto Negotiation Configuration prompt appears (Figure 3-5).

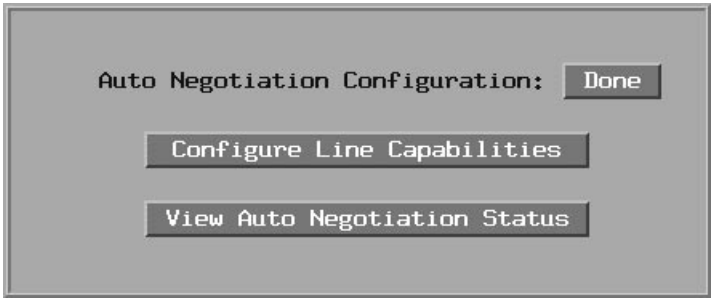

Figure 3-5. Auto Negotiation Configuration Prompt

2. **Click on Configure Line Capabilities.**

   The Auto Neg Advertising Capabilities window appears (Figure 3-6).

Figure 3-6. Auto Neg Advertising Capabilities Window

3. **Edit the Line Advertising Capabilities parameter.**

   Refer to the following description for guidelines.

4. **Click on OK.**

   The Auto Negotiation Configuration prompt returns (refer to Figure 3-5).

Parameter: **Line Advertising Capabilities**

Default: 11

Options: 00 | 01 | 10 | 11

Function: Specifies a code representing the line configurations available to remote nodes with automatic line negotiation capability, as follows:

Advertised Line Speed	Interface Line Speed Code
100BASE-TX, half-duplex only	10
100BASE-TX, full-duplex only	01
100BASE-TX, both half- and full-duplex	11
No advertising	00

Instructions: Select a line advertising code.

MIB Object ID: 1.3.6.1.4.1.18.3.4.16.1.1.9

To view the current line negotiation status:

1. **Start at the Auto Negotiation Configuration prompt (refer to Figure 3-5).**
2. **Click on View Auto Negotiation Status.**

Note: *Site Manager can report line negotiation status only in dynamic mode.*

The Auto Negotiation State Information window appears (Figure 3-7).

This window provides details about the current line configuration. Refer to Table 3-1 for information about the status display.

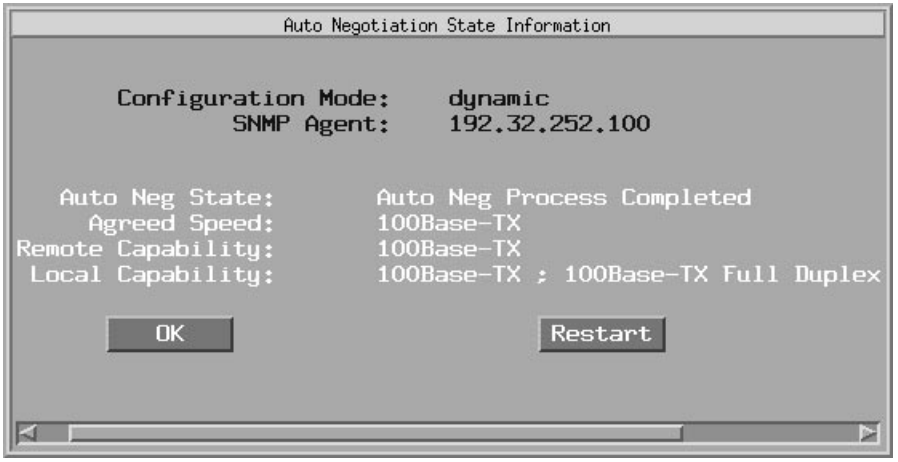

Figure 3-7. Auto Negotiation State Information Window

Table 3-1. 100-Mb/s Ethernet Auto Negotiation State Information

Category	State Displayed	Description
Auto Neg State	Auto Neg Process Completed	The router and the endstation have successfully negotiated a line speed and data transmission is taking place.
	Auto Neg Process Occurring	The router and the endstation are currently negotiating a line speed.
	State Unknown	The router and the endstation cannot begin the process of line negotiation, probably because the remote station does not have automatic line negotiation capability.
Agreed Speed	100Base-TX	The line is processing at 100 Mb/s half-duplex.
	100Base-TX Full Duplex	The line is processing at 100 Mb/s full-duplex.
Remote Capability	Any valid CSMA/CD line speed	Indicates the line speed configuration that the remote endstation is currently advertising for this line.
Local Capability	100Base-TX	Indicates the line speed or speeds the router is currently advertising for this line (the current setting of the Line Advertising Capabilities parameter).
	100Base-TX Full Duplex	
	100Base-TX; 100Base-TX Full Duplex	

3. **Proceed as follows, depending on the status of the transaction:**

   - **If negotiation or data transmission is taking place, click on OK.**

     The Auto Negotiation State Information window closes, and negotiation or data transmission continues.

   - **If there is a problem with the line, click on Restart.**

     This action resets all automatic line negotiation parameters and restarts the line negotiation process.

Editing FDDI Line Details

If the line you select to edit is an FDDI line, the Configuration Manager displays the Edit FDDI Parameters window (Figure 3-8).

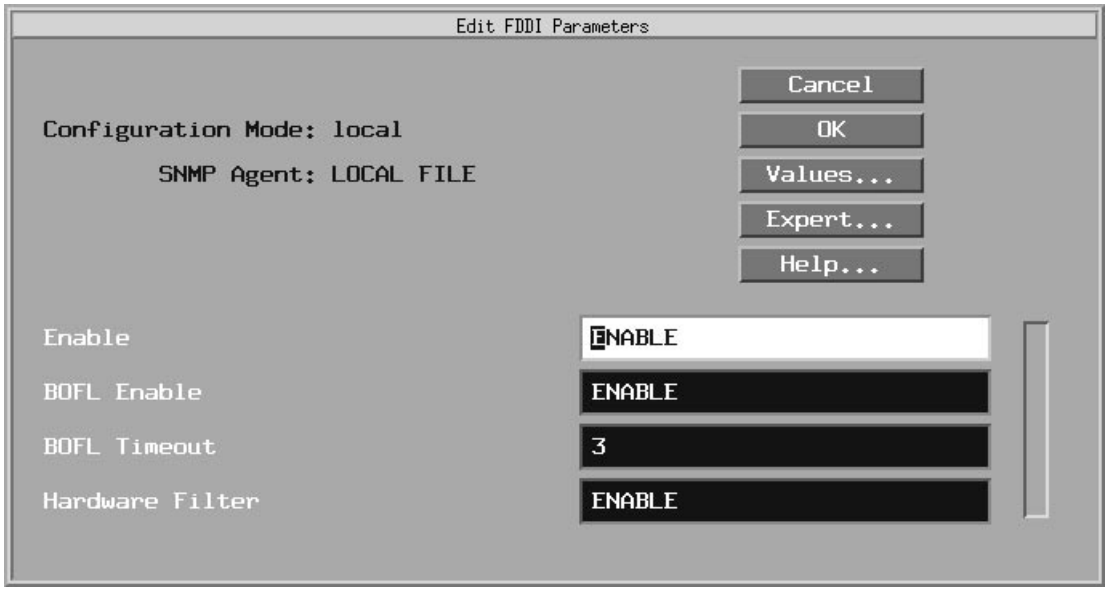

Figure 3-8. Edit FDDI Parameters Window

To edit FDDI line details:

1. **Enter or select new values for the FDDI line detail parameters you want to edit.**

   Refer to the descriptions following this procedure for guidelines.

2. **Click on OK or, if you want to edit FDDI Advanced Attributes, click on Expert.**

   Refer to “Editing FDDI Advanced Attributes” for information.

Parameter:	**Enable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables the FDDI circuit for the selected connector.
Instructions:	Set to Disable if you want to disable the FDDI circuit for the selected connector.
MIB Object ID:	1.3.6.1.4.1.18.3.4.4.1.2

Parameter:	**BOFL Enable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables Breath of Life polling. When you set this parameter to Enable and the LLC Data Enable parameter to Enable in the FDDI MAC Attributes window, if the link becomes unavailable, the router disables the LLC interface after the time you specify using the BOFL Timeout parameter. When you set this parameter to Disable, the router disables the LLC interface immediately after the link becomes unavailable.
Instructions:	Accept the default, Enable, or set to Disable. We recommend that you enable BOFL.
MIB Object ID:	1.3.6.1.4.1.18.3.4.4.1.7

Parameter:	**BOFL Timeout**
Default:	3 seconds
Range:	0 to 3600 seconds
Function:	When BOFL is enabled and the link becomes unavailable, this parameter specifies the time Site Manager waits before disabling the LLC interface.
Instructions:	Accept the default value, 3 seconds, or specify a new value. Be sure to set the BOFL Enable parameter to Enable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.4.1.8

Parameter:	**Hardware Filter**
Default:	Disable (the default changes to Enable when you add a circuit and reply OK to the prompt `Do you want to enable Hardware Filters on this circuit?`)
Options:	Enable | Disable
Function:	When you set this parameter to Enable, the link module filtering hardware, if present, does not allow the router to copy local frames into memory. In essence, the filtering hardware drops local frames at the interface. Hardware filtering improves performance because the bridging software no longer uses resources to receive and reject those frames. Local frames contain both destination and source MAC addresses that the router has learned on the interface. The bridge software teaches the hardware filter which MAC addresses are local to an interface. To drop a frame, the hardware filter must have already learned its destination and source addresses from the bridge software. Otherwise, the router copies the frame into memory and the bridge software processes the frame.
Instructions:	Set to Enable only if you enabled the bridge and the link module has hardware filters.
MIB Object ID:	1.3.6.1.4.1.18.3.4.4.1.36

Editing FDDI Advanced Attributes

To edit the SMT, MAC, path, or port attributes for an FDDI line:

1. **Start at the Edit FDDI Parameters window (refer to Figure 3-8).**
2. **Click on Expert.**

   The FDDI Advanced Attributes window appears (Figure 3-9).

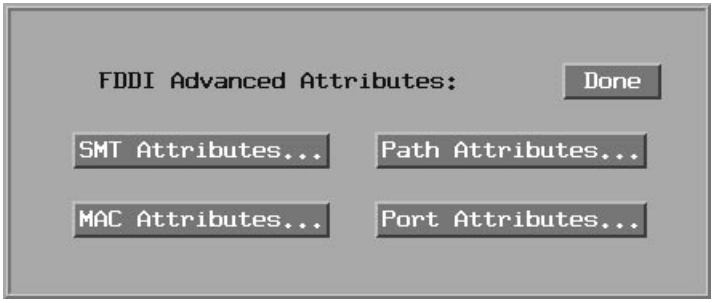

Figure 3-9. FDDI Advanced Attributes Window

Caution: *Changing any of the FDDI Advanced Attributes parameters will affect the operation of your FDDI network. You should understand how to use each of these parameters to improve network performance before you modify any of them.*

Editing FDDI SMT Attributes

To edit the FDDI SMT attributes:

1. **Start at the FDDI Advanced Attributes window (refer to Figure 3-9).**
2. **Click on SMT Attributes.**

   The FDDI SMT Attributes window appears (Figure 3-10).

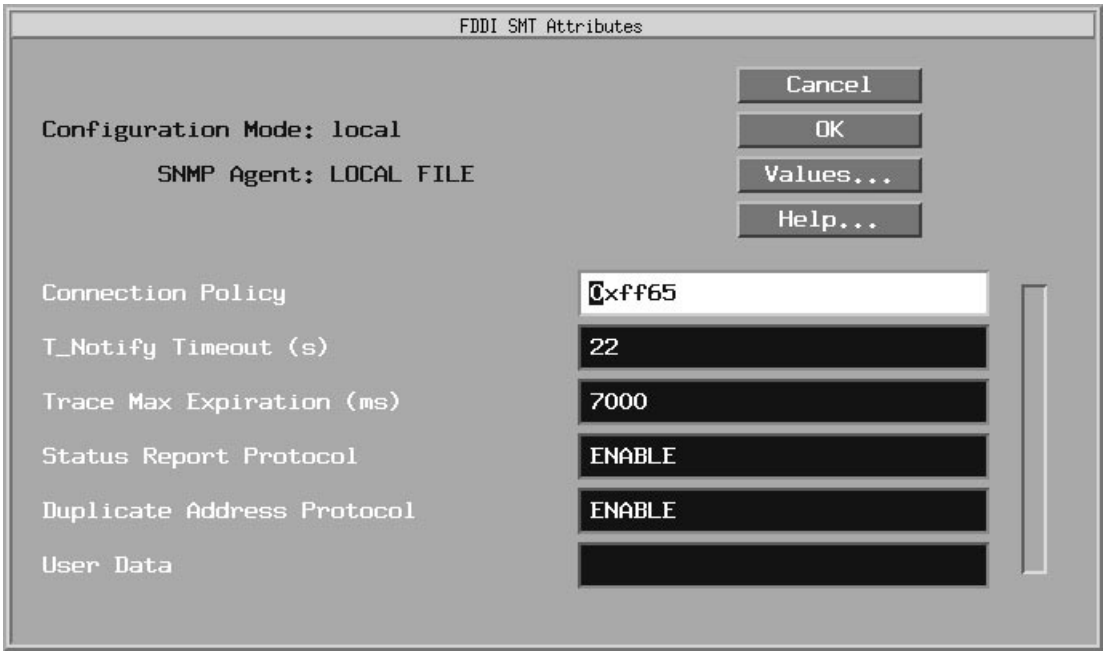

Figure 3-10. FDDI SMT Attributes Window

3. **Enter or select new values for the FDDI SMT parameters you want to edit.**

   Refer to the descriptions following this procedure for guidelines.

4. **Click on OK.**

Parameter: **Connection Policy**

Default: 0xff65

Range: 0x0 to 0xffff

Function: Specifies the connection policies the line requests at the FDDI station.

A station sets the corresponding policy for each of the connection types that it wants to reject. The policy descriptor takes the form “rejectX-Y” where X denotes the physical connection (PC) type of the local port, and Y denotes the PC type of the neighbor port.

X and Y can take the following values:

A	Indicates that the port is a dual-attachment station or concentrator that attaches to the primary IN and the secondary OUT when attaching to the dual FDDI ring
B	Indicates that the port is a dual-attachment station or concentrator that attaches to the secondary IN and the primary OUT when attaching to the dual FDDI ring
S	Indicates a port in a single-attachment station or concentrator
M	Indicates a port in a concentrator that serves as a master to a connected station or concentrator

Instructions: Specify the status word value that represents the connection policies you want this line to reject, as follows.

Start with a value of zero for the status word (all bits set to 0). For each connection policy you want the node to reject, add to the status word value the number 2 raised to a power specified in Table 3-2. This is equivalent to setting a bit to 1 for each policy that you want the node to reject. Table 3-2 lists the powers and the bits. Figure 3-11 shows the default connection policy.

MIB Object ID: 1.3.6.1.4.1.18.3.4.4.1.30

Note: *You set the status word value to reflect* local *connection policies. Setting a particular connection policy does not necessarily mean that the station will reject the connection. The SMT standard requires that both sides of the connection must agree to reject, or else both sides must accept the connection. The SMT standard requires that you set Bit 15 (rejectM-M) to 1.*

Table 3-2. SMT Connection Policy Values

Policy	Power (Bit Number)	Policy	Power (Bit Number)
rejectA-A	0	rejectS-A	8
rejectA-B	1	rejectS-B	9
rejectA-S	2	rejectS-S	10
rejectA-M	3	rejectS-M	11
rejectB-A	4	rejectM-A	12
rejectB-B	5	rejectM-B	13
rejectB-S	6	rejectM-S	14
rejectB-M	7	rejectM-M	15

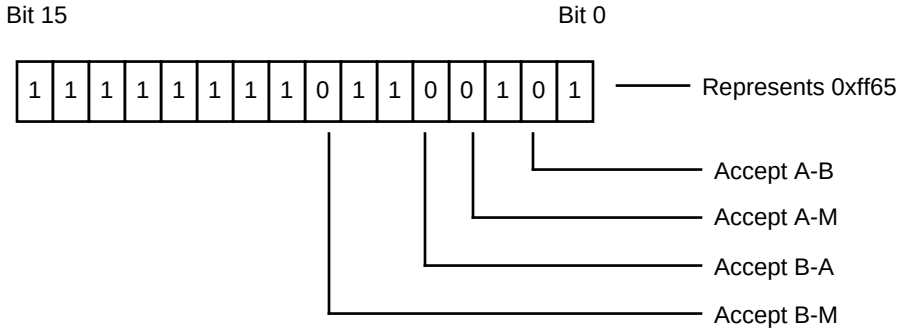

Figure 3-11. Default Connection Policy Status Word

Parameter:	**T_Notify Timeout (s)**
Default:	22 seconds
Range:	2 to 30 seconds
Function:	Specifies the interval between successful iterations of the Neighbor Notification Protocol which – Determines the MAC addresses of the FDDI upstream and downstream neighbors – Detects duplicate MAC addresses on the ring – Generates periodic “keep-alive” traffic that verifies the local MAC transmit and receive paths
Instructions:	Accept the default value of 22 seconds or specify a new value from 2 to 30 seconds.
MIB Object ID:	1.3.6.1.4.1.18.3.4.4.1.31

Parameter:	**Trace Max Expiration (ms)**
Default:	7000 milliseconds (7 seconds)
Range:	6001 to 256000 milliseconds
Function:	Specifies the maximum propagation time for a trace on an FDDI topology.
Instructions:	Enter a value from 6001 to 256000. We recommend accepting the default value of 7000 milliseconds.
MIB Object ID:	1.3.6.1.4.1.18.3.4.15.1.3.1.15

Parameter:	**Status Report Protocol**
Default:	Enable
Options:	Enable | Disable
Function:	Specifies whether the node will generate Status Report Frames (SRFs) for its implemented events (for example, high bit errors, topology changes, trace status events, MAC frame error condition, port LER condition, and MAC duplicate address condition).
Instructions:	Accept the default, Enable, if you want the node to generate SRFs; specify Disable if you do not want the node to generate SRFs. We recommend using Enable to ensure that your FDDI network is ANSI-compliant.
MIB Object ID:	1.3.6.1.4.1.18.3.4.15.1.3.1.14

Parameter:	**Duplicate Address Protocol**
Default:	Enable
Options:	Enable | Disable
Function:	Implements an optional ANSI duplicate address test involving periodic transmission of Network Service Address Network Interface Function (NSA NIF) frames to the source.
Instructions:	Accept the default, Enable, if you want to test for duplicate addresses. Specify Disable if you do not want to test for duplicate addresses.
MIB Object ID:	1.3.6.1.4.1.18.3.4.15.1.3.1.18

Parameter:	**User Data**
Default:	None
Options:	Any string containing up to 32 alphanumeric characters
Function:	Allows you to enter additional information about the router. This information is attached to the SIF frames.
Instructions:	Enter up to 32 alphanumeric characters.
MIB Object ID:	1.3.6.1.4.1.18.3.4.15.1.3.1.8

Editing FDDI MAC Attributes

To edit FDDI MAC attributes:

1. **Click on MAC Attributes in the FDDI Advanced Attributes window (refer to Figure 3-9).**

   The FDDI MAC Attributes window appears (Figure 3-12).

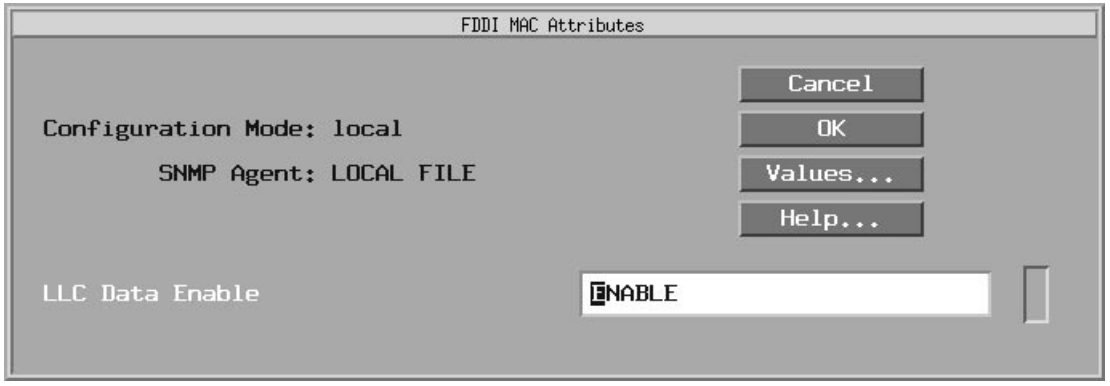

Figure 3-12. FDDI MAC Attributes Window

2. **Select a new value for the LLC Data Enable parameter.**

   Refer to the description following this procedure for guidelines.

3. **Click on OK.**

Parameter:	**LLC Data Enable**
Default:	Enable
Options:	Enable | Disable
Function:	Specifies whether the MAC is available to transmit and receive Logical Link Control (LLC) Protocol Data Units (PDUs). If you accept Enable, the interface to the MAC entity is available to exchange PDUs between the MAC and the local LLC entity when the ring becomes operational. Setting this attribute does not affect transferring and receiving MAC or SMT frame types.
Instructions:	Accept the default, Enable, if you want the MAC available for transmitting and receiving LLC PDUs; specify Disable if you do not want the MAC available for transmitting and receiving LLC PDUs.
MIB Object ID:	13.6.1.4.1.18.3.4.15.2.3.1.17

Editing FDDI Path Attributes

To edit FDDI path attributes:

1. **Start at the FDDI Advanced Attributes window (refer to Figure 3-9).**
2. **Click on Path Attributes.**

   The FDDI Path Attributes window appears (Figure 3-13).

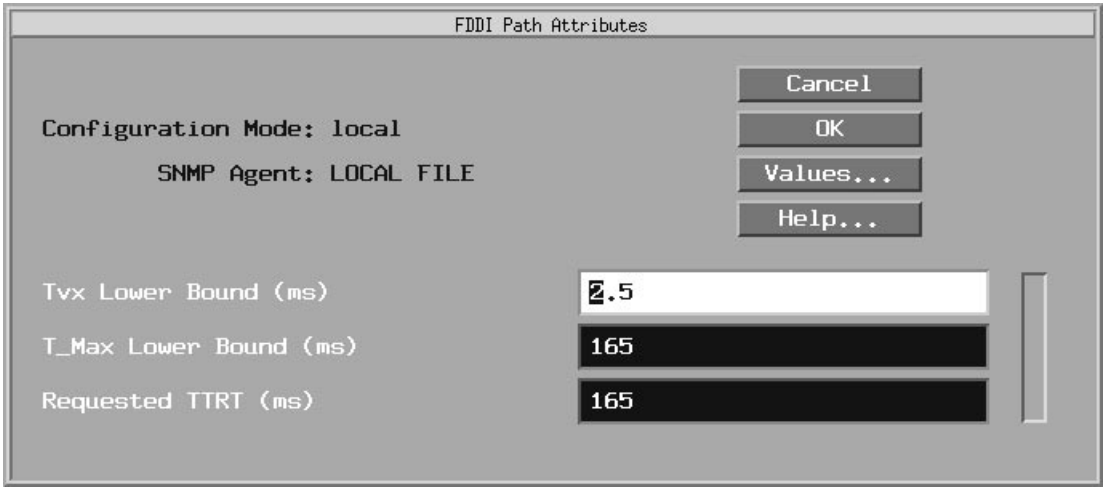

Figure 3-13. FDDI Path Attributes Window

3. **Edit the FDDI path parameters.**

   Refer to the descriptions following this procedure for guidelines.

4. **Click on OK.**

Caution: *Be extremely careful when editing FDDI path parameters such as Requested TTRT. You should change the default values only if the network is part of a production or other specialized environment that requires customizing the parameters.*

Parameter: **Tvx Lower Bound (ms)**

Default: 2.5 milliseconds

Range: The value must be greater than zero and less than the value of Requested TTRT. If the value of Requested TTRT is greater than 5.2 milliseconds, set this parameter to a value less than or equal to 5.2 milliseconds. For example, if the value of Requested TTRT is 165 milliseconds, the value for Tvx Lower Bound must be less than or equal to 5.2 milliseconds (Figure 3-14).

Function: Specifies the minimum time value of the Valid Transmission Timer (Tvx).

Instructions: Accept the default value of 2.5 milliseconds or specify a new value less than or equal to 5.2 milliseconds and less than the value of Requested TTRT.

MIB Object ID: 1.3.6.1.4.1.18.3.4.15.3.3.1.5

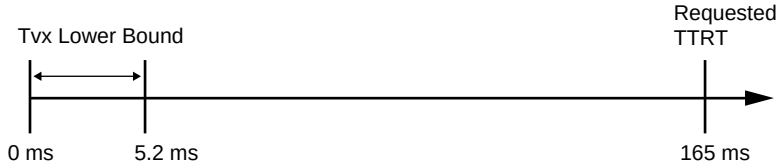

Figure 3-14. Example of Range of Values for Tvx Lower Bound

Parameter:	**T_Max Lower Bound (ms)**
Default:	165 milliseconds
Range:	10 to 1336.9344 milliseconds
Function:	Allows you to specify the maximum time value of TTRT. The value must be greater than or equal to 10 milliseconds, greater than or equal to the value of the Requested TTRT (ms) parameter, and less than or equal to 1336.9344 milliseconds (Figure 3-15).
Instructions:	Accept the default value of 165 milliseconds or specify a new value less than or equal to 1336.9344 milliseconds and greater than or equal to the value of the Requested TTRT (ms) parameter.
MIB Object ID:	1.3.6.1.4.1.18.3.4.15.3.3.1.6

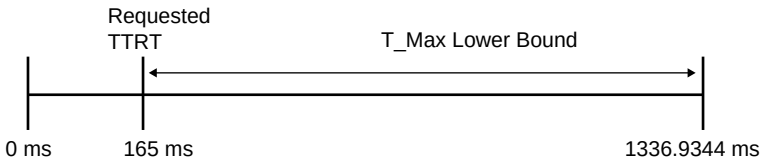

Figure 3-15. Example of Range of Values for T_Max Lower Bound

Parameter:	**Requested TTRT (ms)**
Default:	165 milliseconds
Range:	Variable. This value must be greater than the value specified for the Tvx Lower Bound (ms) parameter and less than or equal to the value specified for the T_Max Lower Bound (ms) parameter (Figure 3-16).
Function:	Specifies the target-token rotation time carried in claim frames issued by the FDDI station.
Instructions:	Accept the default of 165 milliseconds or enter a new value in milliseconds.
MIB Object ID:	1.3.6.1.4.1.18.3.4.4.1.32

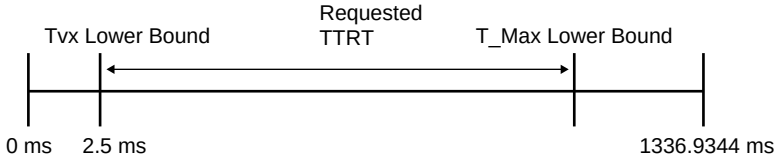

Figure 3-16. Example of Range of Values for Requested TTRT

Editing FDDI Port Attributes

To edit FDDI port attributes:

1. **Start at the FDDI Advanced Attributes window (refer to Figure 3-9).**
2. **Click on Port Attributes.**

   The FDDI Port Attributes window appears (Figure 3-17).

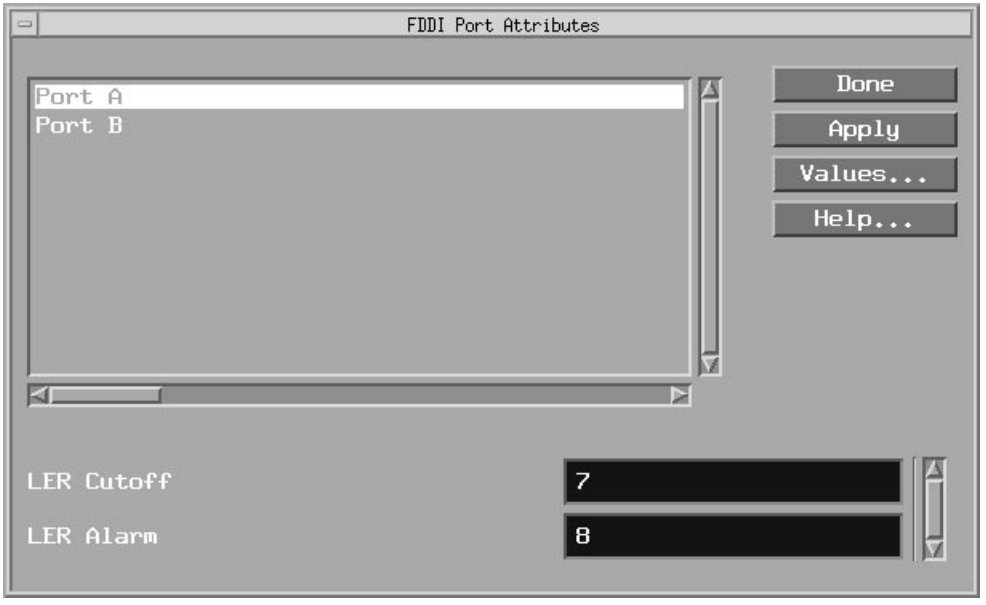

Figure 3-17. FDDI Port Attributes Window

3. **Select the port you want to configure (A or B).**

4. **Select new values for the FDDI port parameters you want to edit.**

   Refer to the descriptions following this procedure for guidelines.

5. **Click on Apply to save your changes.**

   Repeat Steps 3 and 4 to configure the other port, if you want.

6. **Click on Done.**

Parameter:	**LER Cutoff**
Default:	7
Range:	4 to 15
Function:	Specifies the link error rate estimate at which a link connection is broken. It ranges from 10^{-4} to 10^{-15} and is reported as the absolute value of the base 10 logarithm.
Instructions:	Accept the default value of 7 or specify a new value.
MIB Object ID:	1.3.6.1.4.1.18.3.4.15.4.3.1.17

Parameter:	**LER Alarm**
Default:	8
Range:	4 to 15
Function:	Specifies the link error rate estimate at which a link connection generates an alarm. It ranges from 10^{-4} to 10^{-15} and is reported as the absolute value of the base 10 logarithm of the estimate.
Instructions:	Accept the default value of 8 or specify a new value.
MIB Object ID:	1.3.6.1.4.1.18.3.4.15.4.3.1.18

Editing HSSI Line Details

If the line you select to edit is a high-speed serial interface line, the Configuration Manager displays the Edit HSSI Parameters window (Figure 3-18).

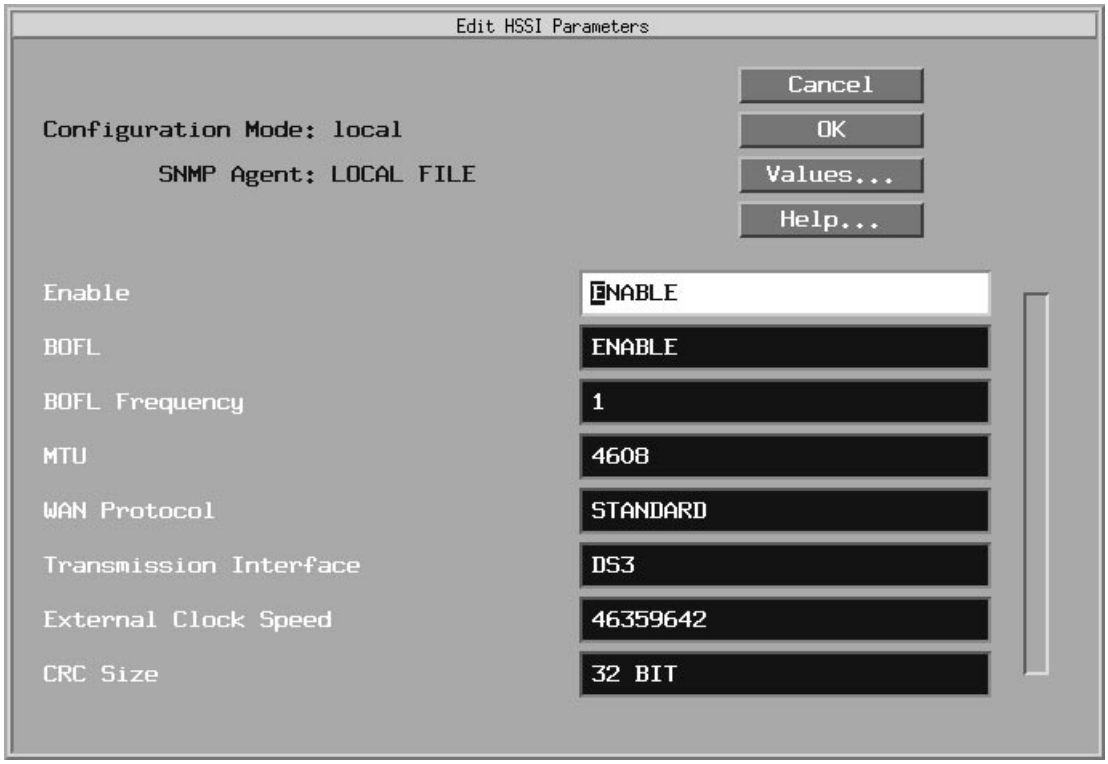

Figure 3-18. Edit HSSI Parameters Window

To edit HSSI line parameters:

1. **Enter or select new values for the HSSI line detail parameters you want to edit.**

   Refer to the descriptions following this procedure for guidelines.

2. **Click on OK.**

Parameter:	**Enable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables this HSSI line.
Instructions:	Set this parameter to either Enable or Disable for this line.
MIB Object ID:	1.3.6.1.4.1.18.3.4.7.1.2

Parameter:	**BOFL**
Default:	Enable
Options:	Enable | Disable
Function:	Enables the transmission of proprietary Ethernet-encapsulated Breath of Life messages *over a point-to-point connection* between the local router and a remote peer. The exchange of BOFL messages provides a level of confidence in the point-to-point connection. If you enable BOFL, the router sends periodic keep-alive messages to the remote peer.
Instructions:	Set to Enable or Disable, depending on whether you want to transmit BOFL messages over this HSSI interface. If you enable BOFL locally, you must also configure the remote peer to enable BOFL. We recommend that you enable BOFL for point-to-point connections between Bay Networks peers. If, however, such a connection occurs through a wide-area transport service such as Frame Relay or SMDS, you must disable BOFL.
MIB Object ID:	1.3.6.1.4.1.18.3.4.7.1.7

Parameter:	**BOFL Frequency**
Default:	1 second
Range:	1 to 60 seconds
Function:	Specifies the interval in seconds between BOFL transmissions. This parameter is valid only if BOFL is set to Enable. After sending a BOFL message, the router starts a timer that has a value equal to 5 times the setting of this parameter. If the router does not receive a BOFL message from the remote peer before the timer expires, the router disables the HSSI circuit, and then attempts to restart it.
Instructions:	Accept the default, 1 second, or specify a new value, making certain that both ends of the point-to-point connection are configured with the same value.
MIB Object ID:	1.3.6.1.4.1.18.3.4.7.1.8

Parameter:	**MTU**
Default:	4608
Range:	3 to 4608 bytes
Function:	Specifies the buffer size (the Maximum Transmission Unit) for the HSSI port and, therefore, determines the largest frame that can travel across the HSSI port.
Instructions:	Set this parameter to a value appropriate for your network.
MIB Object ID:	1.3.6.1.4.1.18.3.4.7.1.9

Parameter:	**WAN Protocol**
Default:	None
Options:	Standard | PassThru | PPP | SMDS | Frame Relay
Function:	Indicates which WAN protocol you enabled on this HSSI circuit.
Instructions:	Accept this setting.
MIB Object ID:	1.3.6.1.4.1.18.3.4.7.1.12

Parameter:	**Transmission Interface**
Default:	DS3
Options:	DS1 | DS3
Function:	Specifies the appropriate MIB for the local management interface (LMI) to use, providing you enable LMI and configure SMDS or Frame Relay across the HSSI interface. The HSSI driver provides no support for either the DS1 or DS3 MIB. Rather, the external DCE (for example, a DL3200 SMDS CSU/DSU from Digital Link) may provide MIB support.
Instructions:	Select a DS1 MIB (specified by RFC 1232) or a DS3 MIB (specified by RFC 1233) depending on the carrier services the attached DCE device provides (DS1 at 1.54 MB/s or DS3 at 44.736 MB/s).
MIB Object ID:	1.3.6.1.4.1.18.3.4.7.1.13

Parameter:	**External Clock Speed**
Default:	46359642 (44.736 MB/s)
Range:	307200 to 52638515
Function:	Specifies the bandwidth that the HSSI channel provides. The HSSI specification requires that the DCE provide a transmit clock that times data transfer across the DTE/DCE interface. The value you set for this parameter does not actually affect hardware initialization. Some routing protocol software uses this parameter value for route selection.
Instructions:	Enter a value equal or close to the data transmission rate across the HSSI.
MIB Object ID:	1.3.6.1.4.1.18.3.4.7.1.14

Parameter:	**CRC Size**
Default:	32 bit
Options:	16 bit | 32 bit
Function:	Specifies an error detection scheme. You can choose either 16-bit (standard ITU-T) or 32-bit (extended) to detect errors in the packet.
Instructions:	Set this parameter to either 16-bit or 32-bit, making certain that the remote end of the HSSI connection is configured for the same value.
MIB Object ID:	1.3.6.1.4.1.18.3.4.7.1.15

Editing T1 Line Details

If the line you select to edit is a T1 line, the Configuration Manager displays the T1 Line Entry window (Figure 3-19).

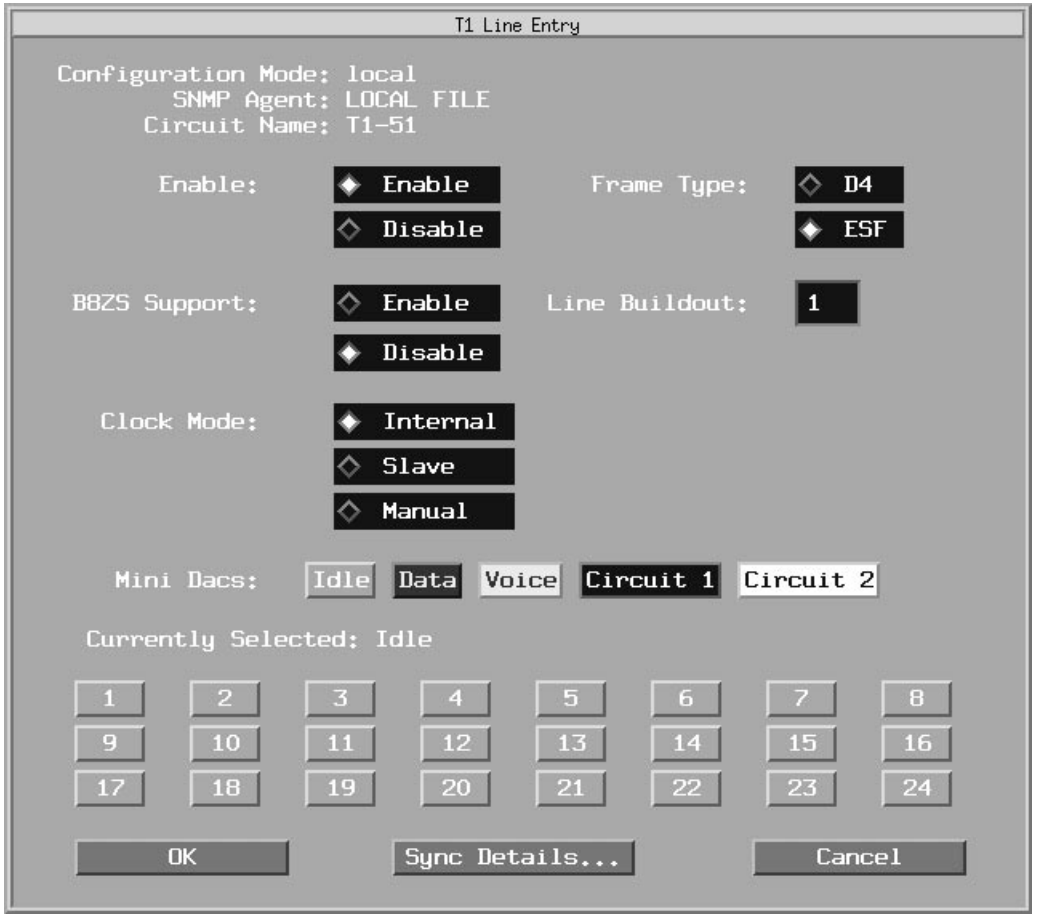

Figure 3-19. T1 Line Entry Window

To edit T1 line details:

1. **Select new values for the T1 service parameters you want to edit.**

   Refer to the descriptions following this procedure for guidelines.

2. **Click on Sync Details, if you want to edit synchronous line parameters.**

   Refer to Chapter 4 for instructions.

3. **Click on OK.**

Parameter:	**Enable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables the T1 line.
Instructions:	Set to Disable if you want to disable the T1 line.
MIB Object ID:	1.3.6.1.4.1.18.3.4.10.1.2

Parameter:	**Frame Type**
Default:	ESF
Options:	ESF | D4
Function:	Selects either ESF (extended superframe) or D4 framing format. D4 transmits superframes consisting of 12 individual frames. ESF, in contrast, transmits superframes consisting of 24 individual D4 frames and provides enhanced signaling and synchronization.
Instructions:	Select ESF or D4, based on the frame format that the associated T1 equipment requires.
MIB Object ID:	1.3.6.1.4.1.18.3.4.10.1.7

Parameter:	**B8ZS Support**
Default:	Disable
Options:	Disable | Enable
Function:	Enables or disables Bipolar with 8-Zero substitution (a mechanism that maintains T1 synchronization).
Instructions:	Select Enable or Disable, depending on the ability of the associated T1 equipment to support B8ZS.
MIB Object ID:	1.3.6.1.4.1.18.3.4.10.1.9

Parameter: **Line Buildout**

Default: 1

Range: 1 to 655 (feet) ft

Function: Conditions router signals to mitigate attenuation, which depends on the physical length of the T1 line.

Instructions: Enter the approximate length of the cable connecting the router and the associated T1 equipment.

MIB Object ID: 1.3.6.1.4.1.18.3.4.10.1.8

Parameter: **Clock Mode**

Default: Internal

Options: Internal | Slave | Manual

Function: Specifies the source of the T1 transmit clock.

Internal	Indicates that the router sets the clock.
Slave	Indicates that the incoming data stream sets the clock.
Manual	Indicates that jumpers on the T1 link module set the clock. (Refer to *Installing and Maintaining BN Routers* or *Installing and Maintaining ASN Routers and BNX Platforms* for information on link module hardware configuration.)

Instructions: Select the clocking mode, making certain that the associated T1 equipment is compatible.

MIB Object ID: 1.3.6.1.4.1.18.3.4.10.1.10

Parameter: **Mini Dacs**

Default: Idle

Options: Idle | Data | Voice | Circuit 1 | Circuit 2

Function: Assigns a specific function to each T1 channel, as follows:

Idle	Makes the channel idle
Data	Assigns the channel to data passthrough (T1 connector to T1 connector)
Voice	Assigns the channel to voice passthrough (T1 connector to T1 connector)
Circuit 1	Assigns the channel to the first T1 connector
Circuit 2	Assigns the channel to the second T1 connector

Instructions: Assign the appropriate function to the T1 channels.

To configure data and voice passthrough, assign identical channels to data or voice on both T1 connectors. For example, if the first T1 connector allocates Channels 1 through 8 to voice passthrough and Channels 9 through 16 to data passthrough, the second T1 connector must also allocate Channels 1 through 8 to voice passthrough and Channels 9 through 16 to data passthrough.

You cannot allocate T1 channels to both T1 circuits. For example, if you allocate Channels 17 through 24 to Circuit 1 on the first T1 connector, you must make these channels idle or allocate them to Circuit 2 on the second T1 connector.

MIB Object ID: 1.3.6.1.4.1.18.3.4.10.1.11

Editing Token Ring Line Details

If the line you select to edit is a Token Ring line, the Configuration Manager displays the Edit Token Ring Parameters window (Figure 3-20).

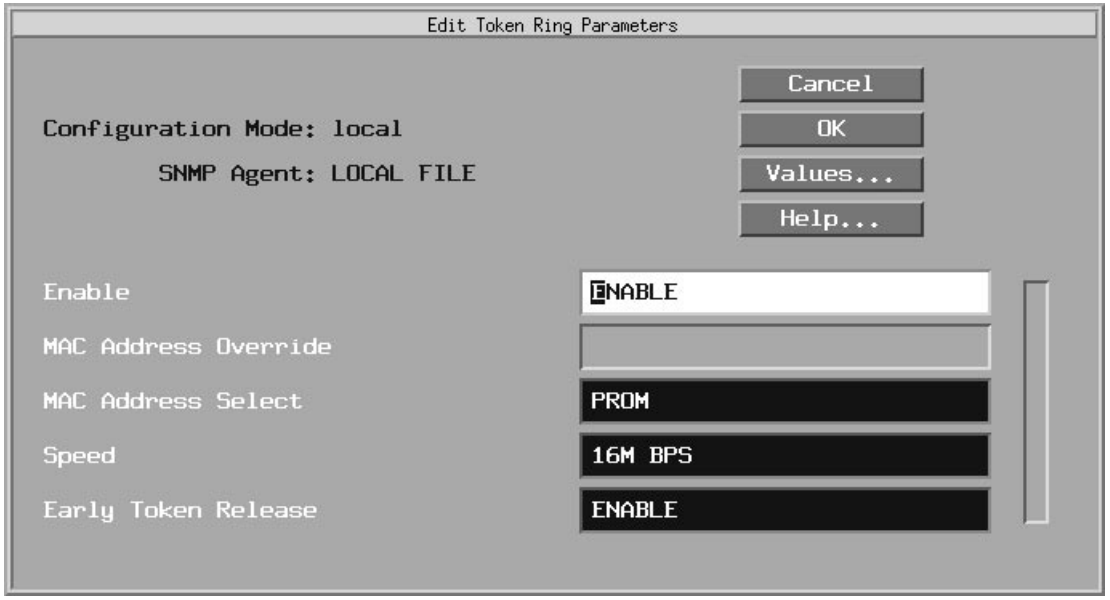

Figure 3-20. Edit Token Ring Parameters Window

To edit Token Ring line details:

1. **Enter or select new values for the Token Ring parameters you want to edit.**

   Refer to the descriptions following this procedure for guidelines.

2. **Click on OK.**

Parameter:	**Enable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables the Token Ring circuit.
Instructions:	Set to Disable if you want to disable the Token Ring circuit.
MIB Object ID:	1.3.6.1.4.1.18.3.4.2.1.2

Parameter:	**MAC Address Override**
Default:	None
Options:	Any valid, 48-bit MAC-level address
Function:	Assigns a user-specified MAC address.
Instructions:	If you want the router to generate the MAC address for this Token Ring interface, ignore this parameter. If you want to specify a MAC address (for example, to avoid host number conflicts on a directly connected IPX or XNS network), enter the 48-bit MAC address in MSB format, that is, enter 0x followed by 12 hexadecimal digits. If you enter a MAC address with this parameter, you must set the MAC Address Select parameter to CNFG.
MIB Object ID:	1.3.6.1.4.1.18.3.4.2.1.9

Parameter:	**MAC Address Select**
Default:	PROM
Options:	BOXWIDE | PROM | CNFG
Function:	Determines the source of the MAC address.
Instructions:	Enter BOXWIDE if you want the Token Ring interface to use a MAC address that the software generates from the router's serial number. Enter PROM if you want the Token Ring interface to use a MAC address from programmable read-only memory on the Token Ring link module. Enter CNFG if you explicitly assigned a MAC address with the MAC Address Override parameter.
MIB Object ID:	1.3.6.1.4.1.18.3.4.2.1.10

Parameter:	**Speed**
Default:	16 Mb/s
Options:	16 Mb/s | 4 Mb/s
Function:	Specifies the speed of the Token Ring media. If you select 16 Mb/s, the router enables the Early Token Release protocol, which is used extensively on 16-Mb/s media. In the unlikely event that you want to disable Early Token Release over 16-Mb/s Token Ring media, you can do so with the Early Token Release parameter.
Instructions:	Enter the ring speed.
MIB Object ID:	1.3.6.1.4.1.18.3.4.2.1.11

Parameter:	**Early Token Release**
Default:	Enable
Options:	Enable | Disable
Function:	Indicates whether the token can return to the ring before the recipient copies all data. This parameter is valid only when you set the Speed parameter to 16 Mb/s.
Instructions:	Accept the current value.
MIB Object ID:	1.3.6.1.4.1.18.3.4.2.1.12

Editing ATM Line Details

The type of ATM link module you use in your router determines how you edit the line details. For information about selecting and configuring ATM link modules, refer to *Configuring ATM Services*.

This section describes how to edit line details for ATM FRE2 and ATM ARE link modules. To edit line details for ATM DXI, follow the procedure for customizing synchronous lines in Chapter 4.

If the line you select to edit is an ATM FRE2 or an ATM ARE line, the Edit ATM Connector window appears (Figure 3-21).

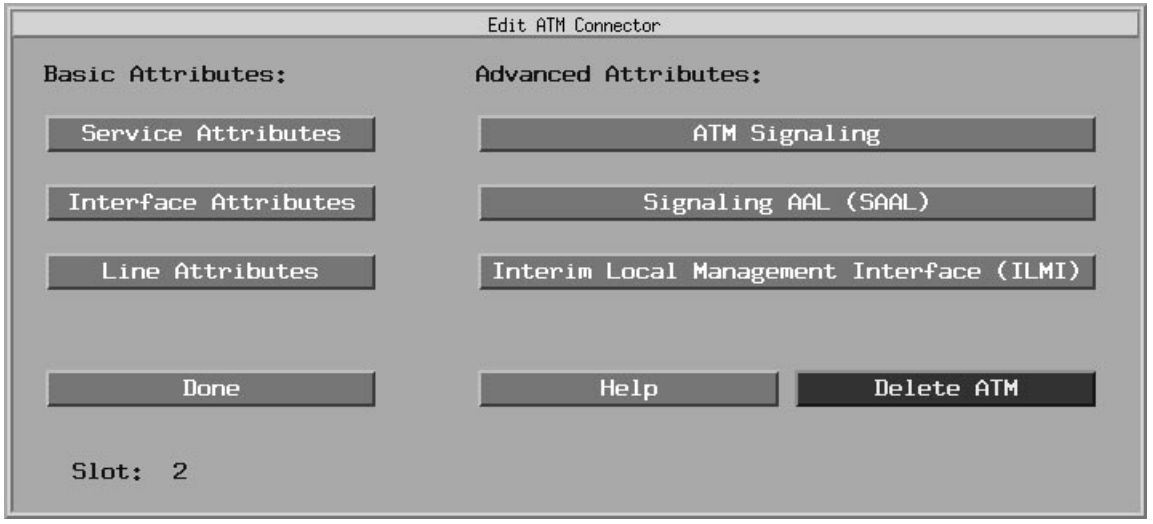

Figure 3-21. Edit ATM Connector Window

Editing ATM FRE2 Line Details

This section describes how to edit the line details for the following ATM FRE2 link modules:

- 74023 ATM FRE2 OC-3, MM
- 74024 ATM FRE2 OC-3, SM

To edit line attributes for an ATM FRE2 module:

1. **Start at the Edit ATM Connector window (refer to Figure 3-21).**
2. **Click on Line Attributes.**

   The Edit ATM/ALC Parameters window appears (Figure 3-22).

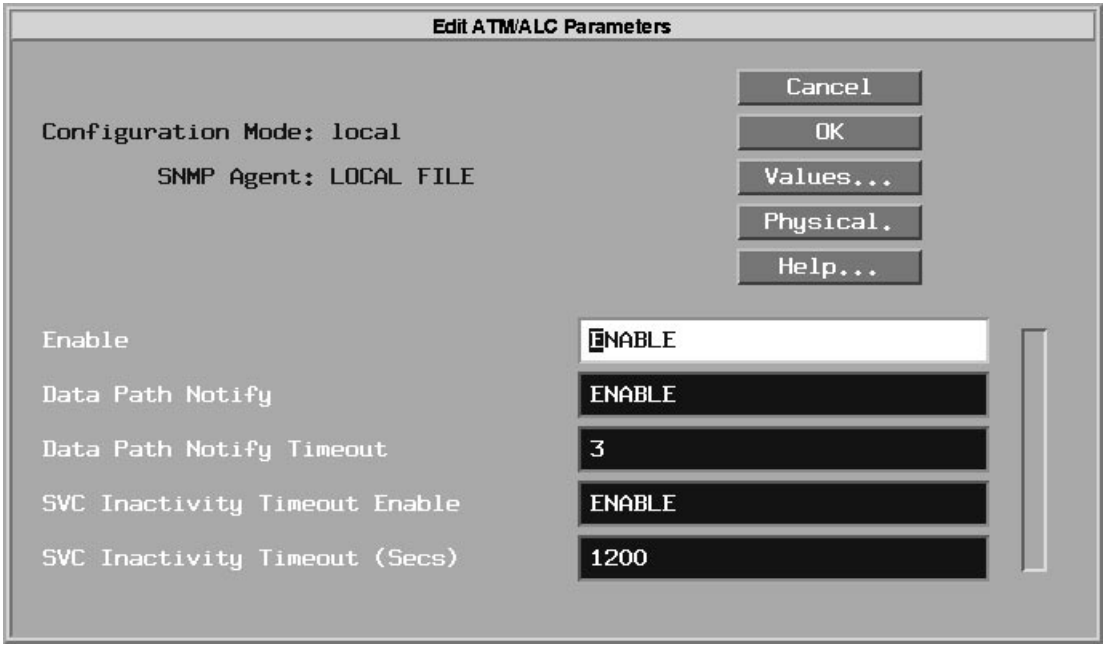

Figure 3-22. Edit ATM/ALC Parameters Window

3. **Select new values for the ATM line detail parameters you want to edit.**

   Refer to the descriptions following this procedure for guidelines.
4. **Click on OK, or click on Physical to edit physical line parameters.**

   For information on physical line parameters, refer to “Editing ATM Physical Attributes,” later in this chapter.

Parameter:	**Enable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables the ATM circuit for this connector.
Instructions:	Select Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.23.2.1.1.2

Parameter:	**Data Path Notify**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables the Data Path Notify function, which disables the data path interface when the physical interface becomes non-operational.
Instructions:	Accept the default, Enable, if you want to disable the data path interface when the physical interface becomes non-operational. Select Disable if you do not want the router to disable the data path interface when the physical interface becomes non-operational.
MIB Object ID:	1.3.6.1.4.1.18.3.4.23.2.1.1.14

Parameter:	**Data Path Notify Timeout**
Default:	3 seconds
Range:	0 to 3600 seconds
Function:	Specifies the number of seconds to wait before implementing the Data Path Notify function. When the Data Path Notify parameter is set to Enable, Site Manager sets a timer to this value when the state of the physical interface changes from operational to non-operational.
Instructions:	Either accept the default value, 3 seconds, or specify a new value.
MIB Object ID:	1.3.6.1.4.1.18.3.4.23.2.1.1.15

Parameter:	**SVC Inactivity Timeout Enable**
Default:	Enable
Options:	Enable | Disable
Function:	If you select Enable, the router disables any switched virtual circuit (SVC) on which the router receives or transmits no cells for the number of seconds you specify using the SVC Inactivity Timeout (Secs) parameter. If you select Disable, the router keeps SVCs open unless you close them by another method.
Instructions:	Select Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.23.2.1.1.28

Parameter:	**SVC Inactivity Timeout (Secs)**
Default:	1200 seconds
Range:	60 to 3600 seconds
Function:	If the router receives or transmits no cells on an SVC for this number of seconds, it closes the SVC, providing that you set the SVC Inactivity Timeout Enable parameter to Enable.
Instructions:	Enter an appropriate time, and be sure to set the SVC Inactivity Timeout Enable parameter to Enable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.23.2.1.10

Editing ATM Physical Attributes

You need to edit ATM physical attributes only when configuring a SONET OC-3 line. To edit ATM physical attributes:

1. **Start at the Edit ATM/ALC Parameters window (refer to Figure 3-22).**
2. **Click on Physical.**

   The ATM/ALC Physical Interface Attributes window appears (Figure 3-23).

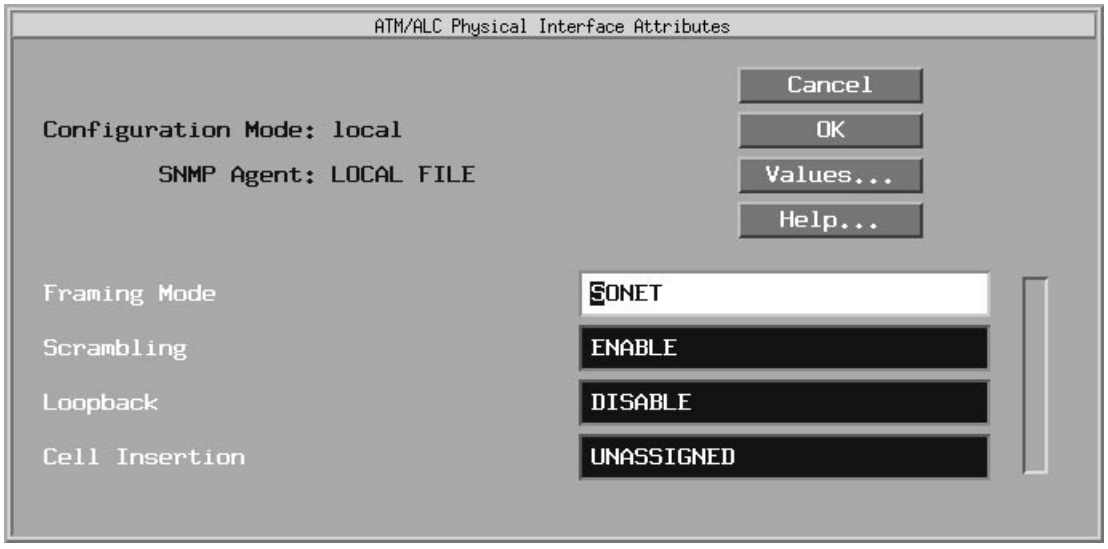

Figure 3-23. ATM/ALC Physical Interface Attributes Window

3. **Edit the parameters.**

   Refer to the descriptions following this procedure for guidelines.
4. **Click on OK.**

   The Edit ATM Connector window appears (refer to Figure 3-21).
5. **Click on OK.**

Parameter:	**Framing Mode**
Default:	SONET
Options:	SDH | SONET
Function:	Specifies either SDH or SONET framing mode.
Instructions:	Select SDH or SONET.
MIB Object ID:	1.3.6.1.4.1.18.3.4.23.2.11.1.4

Parameter:	**Scrambling**
Default:	Enable
Options:	Enable | Disable
Function:	Enabling scrambling randomizes cell payload sufficiently to guarantee cell synchronization. If you select Disable, cell synchronization problems may result.
Instructions:	Select Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.23.2.11.1.5

Parameter:	**Loopback**
Default:	Disable
Options:	Enable | Disable
Function:	Specifies whether or not to use loopback diagnostic mode on this line. In loopback diagnostic mode, the router retransmits received data to the sender.
Instructions:	Select Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.23.2.11.1.7

Parameter:	**Cell Insertion**
Default:	Unassigned
Options:	Idle | Unassigned
Function:	In the absence of user cells, the framer device fills idle bandwidth with either idle or unassigned cells.
Instructions:	Select Idle or Unassigned.
MIB Object ID:	1.3.6.1.4.1.18.3.4.23.2.11.1.49

Editing ATM ARE Line Details

This section describes how to edit the line details for the following ATM ARE link modules:

- AG13110112 ARE OC-3, MM
- AG13110113 ARE OC-3, SM
- AG13110114 ARE, DS3
- AG13110115 ARE, E3

To edit the line details for ATM ARE modules:

1. **Start at the Edit ATM Connector window (refer to Figure 3-21).**
2. **Click on Line Attributes.**

   The ATM/ARE Line Driver Attributes window appears (Figure 3-24).

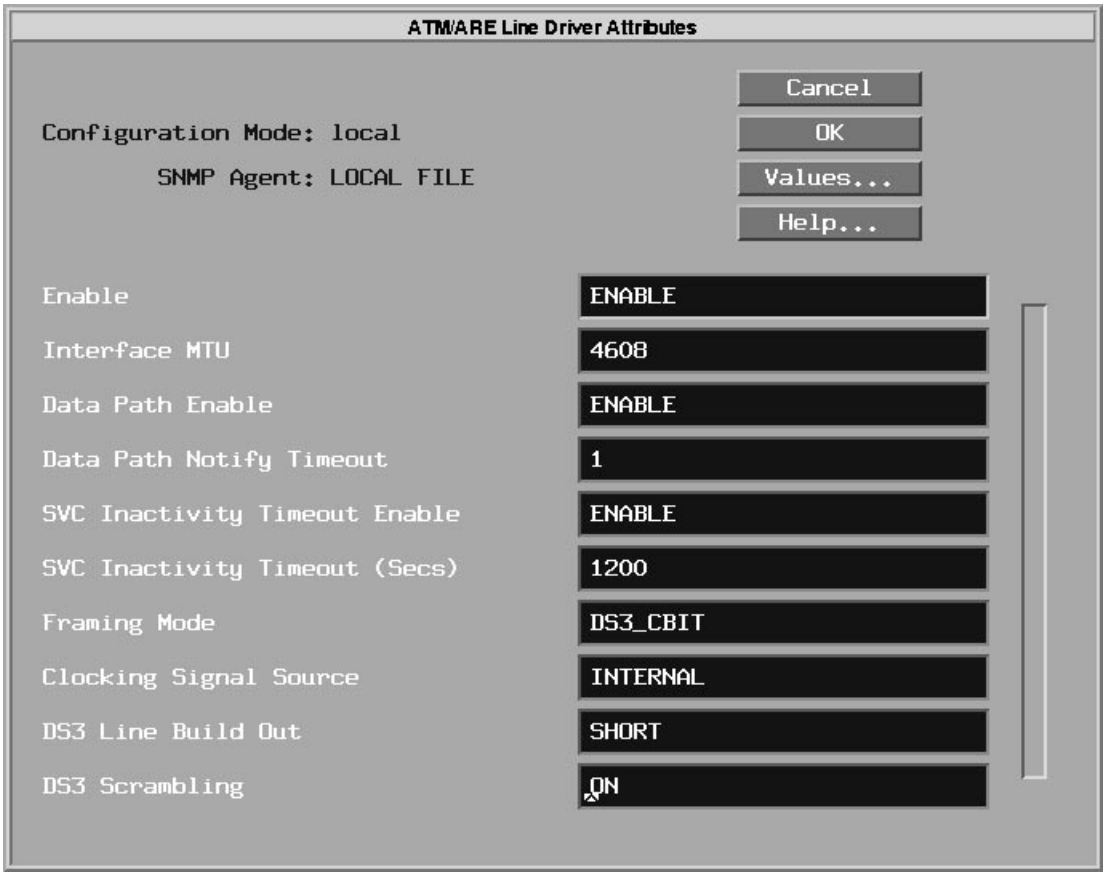

Figure 3-24. ATM/ARE Line Driver Attributes Window

3. **Enter or select new values for the parameters you want to edit.**
   Refer to the descriptions following this procedure for guidelines.
4. **Click on OK.**

Parameter:	**Enable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables the driver.
Instructions:	Select Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.23.3.2.1.2

Parameter:	**Interface MTU**
Default:	4608
Range:	1 to 9188 octets
Function:	Specifies the largest packet size that the router can transmit on this interface.
Instructions:	Enter a value that is appropriate for the network.
MIB Object ID:	1.3.6.1.4.1.18.3.4.23.3.2.1.9

Parameter:	**Data Path Enable**
Default:	Enable
Options:	Enable | Disable
Function:	If you disconnect the cable from the ATM module, this parameter specifies whether or not the router disables the interface between the driver and the higher-level software (the data path interface). If you select Enable, when you disconnect the cable from the ATM, the router disables the data path interface after the time you specify with the Data Path Notify Timeout parameter. If you select Disable, the router does not disable the data path interface when you disconnect the cable from the ATM module.
Instructions:	Select Enable or Disable. If you select Enable, be sure to enter an appropriate value for the Data Path Notify Timeout parameter.
MIB Object ID:	1.3.6.1.4.1.18.3.4.23.3.2.1.11

Parameter:	**Data Path Notify Timeout**
Default:	1 second
Range:	0 to 3600 seconds
Function:	Defines the time the router waits before disabling the data path interface when you disconnect the cable from the ATM module, providing that you set the Data Path Enable parameter to Enable.
Instructions:	Accept the default or enter an appropriate time value.
MIB Object ID:	1.3.6.1.4.1.18.3.4.23.3.2.1.12

Parameter:	**SVC Inactivity Timeout Enable**
Default:	Enable
Options:	Enable | Disable
Function:	If you select Enable, the router disables any switched virtual circuit (SVC) on which the router receives or transmits no cells for the number of seconds you specify using the SVC Inactivity Timeout (Secs) parameter. If you select Disable, the router keeps SVCs open unless you close them by another method.
Instructions:	Select Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.23.3.2.1.13

Parameter:	**SVC Inactivity Timeout (Secs)**
Default:	1200 seconds
Range:	60 to 3600 seconds
Function:	If the router receives or transmits no cells on an SVC for this number of seconds, it closes the SVC, providing that you set the SVC Inactivity Timeout Enable parameter to Enable.
Instructions:	Enter an appropriate time, and be sure to set the SVC Inactivity Timeout Enable parameter to Enable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.23.3.2.1.14

Parameter:	**Framing Mode**
Default:	SONET
Options:	SDH | SONET | CBIT | M23 | G751 | G832
Function:	Specifies the transceiver mode for the physical interface.
Instructions:	Select a transceiver mode as follows: – SDH or SONET for OC-3 modules – CBIT or M23 for DS3 modules – G751 or G832 for E3 modules
MIB Object ID:	1.3.6.1.4.1.18.3.4.23.3.2.1.17

Parameter:	**Clocking Signal Source**
Default:	Internal
Options:	Internal | External
Function:	Specifies whether the router uses its internal clock or an external clock for time signals on this interface.
Instructions:	Select Internal to use the router's clock; select External to use an external clock.
MIB Object ID:	1.3.6.1.4.1.18.3.4.23.3.2.1.18

Parameter:	**DS3 Line Build Out**
Default:	Short
Options:	Short | Long
Function:	Conditions router signals to mitigate attenuation, which depends on the physical length of the line. You can set this parameter only when using DS3 modules.
Instructions:	Select Short for lines shorter than 225 ft; select Long for lines 225 ft or longer.
MIB Object ID:	1.3.6.1.4.1.18.3.4.23.3.2.1.23

Parameter:	**DS3 Scrambling**
Default:	On
Options:	On | Off
Function:	If you select On, the router randomizes cell payload sufficiently to guarantee cell synchronization. If you select Off, cell synchronization problems may result. Note that ATM devices with different scrambling settings cannot communicate. For example, if you configure a router to enable scrambling, and configure a hub to disable scrambling, the router and hub cannot communicate. You can only set this parameter when using DS3 modules.
Instructions:	Select On or Off. If you select On, be sure to enable scrambling for all devices on the network. If you select Off, be sure to disable scrambling for all devices on the network.
MIB Object ID:	1.3.6.1.4.1.18.3.4.23.3.2.1.22

Chapter 4
Customizing Synchronous and Asynchronous Lines

This chapter describes how to edit synchronous and asynchronous line service parameters to customize physical-layer WAN protocols. It contains instructions for editing

- Synchronous line service parameters, including special discussion of the following parameter groups:
  - — Point-to-Point addresses
  - — KG84A support
- Line parameters for the Link Access Procedure Balanced (LAPB) protocol
- Asynchronous line service parameters

Before you can edit the line details, you must access line service parameters (refer to Chapter 2).

Note: *To edit E1, Ethernet, FDDI, HSSI, T1, Token Ring, ATM FRE2, or ATM ARE line details, refer to Chapter 3.*

For each parameter associated with the synchronous and asynchronous lines, this chapter provides information about default settings, valid parameter options, the parameter function, instructions for setting the parameter, and the MIB object ID.

The Technician Interface allows you to modify parameters by issuing **set** and **commit** commands with the MIB object ID. This process is equivalent to modifying parameters using Site Manager. For more information about using the Technician Interface to access the MIB, refer to *Using Technician Interface Software.*

Caution: *The Technician Interface does not verify that the value you enter for a parameter is valid. Entering an invalid value can corrupt your configuration.*

Editing Synchronous Line Details

If the line you select to edit is a synchronous line, the Configuration Manager displays the Edit SYNC Parameters window (Figure 4-1). Use the window's scroll bar to view all the parameters.

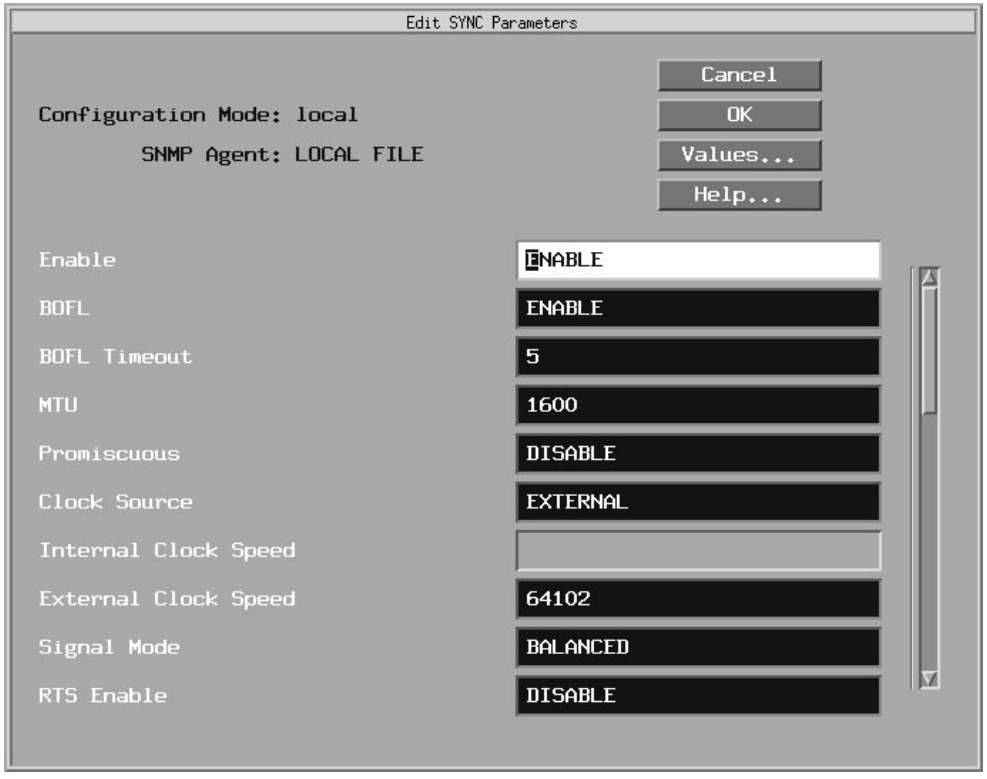

Figure 4-1. Edit SYNC Parameters Window

Note: *When you edit an Octal Sync link module line, or any synchronous line on Bay Networks AN or ASN routers, the router automatically configures the Link Access Procedure Balanced (LAPB) protocol if you configure a circuit for the X.25 protocol. The Edit SYNC Parameters window for these lines includes an additional button for editing LAPB parameters. For information on the LAPB parameters, refer to the section "Editing LAPB Protocol Parameters."*

To edit synchronous line details:

1. **Enter or select new values for the line parameters you want to edit.**

   Refer to the descriptions following this procedure for guidelines. A number of the parameter defaults are different when you configure X.25 on an AN or ASN router. Appendix A lists these defaults.

2. **Click on OK.**

Parameter:	**Enable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables this synchronous line.
Instructions:	Set this parameter to either Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.2

Parameter:	**BOFL**
Default:	Enable
Options:	Enable | Disable
Function:	Enables the transmission of proprietary Breath of Life messages *over a point-to-point connection* between the local router and a remote peer. The exchange of BOFL messages provides a level of confidence in the point-to-point connection. With BOFL enabled, the router sends periodic keep-alive messages to the remote peer.
Instructions:	Set to Enable or Disable, depending on whether you want to transmit BOFL messages over this synchronous interface. If you enable BOFL locally, the remote peer must also be configured to enable BOFL. We recommend that you enable BOFL for point-to-point connections between Bay Networks peers. However, if such a connection is accomplished through a wide-area transport service such as Frame Relay, X.25, or SMDS, you must disable BOFL.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.7

Parameter:	**BOFL Timeout**
Default:	5 seconds
Range:	1 to 60 seconds
Function:	Specifies the time between transmissions of Breath of Life messages from this synchronous interface. Timeout will occur if five periods elapse without both a successful frame transmission and a successful reception. When timeout occurs, the router disables and re-enables the synchronous line. For example, if you set this parameter to 5 seconds, the interface must successfully transmit and receive a frame within 25 seconds. Timeout occurs in 25 seconds. This parameter is valid only if you set BOFL to Enable.
Instructions:	Either accept the default, 5 seconds, or specify a new value.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.8

Parameter:	**MTU**
Default:	1600
Range:	3 to 4608 bytes
Function:	Specifies the largest frame (Maximum Transmission Unit) that the router can transmit on this line.
Instructions:	Set this parameter to a value appropriate for your network. For X.25, use a value at least 5 bytes more than the maximum packet size for the packet level.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.9

Parameter:	**Promiscuous**
Default:	Disable
Options:	Enable | Disable
Function:	Specifies whether address filtering based on the local and remote address is enabled. If you set this parameter to Enable, all frames are received. If you set this parameter to Disable, only frames destined for this local address are received.
Instructions:	Set this parameter to Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.11

Parameter:	**Clock Source**
Default:	External
Options:	External | Internal
Function:	Specifies the origin of the synchronous timing signals. If you set this parameter to Internal, this router supplies the required timing signals. If you set this parameter to External, an external network device supplies the required timing signals. In most cases, this parameter should be set to External.
Instructions:	Set this parameter to either Internal or External, as appropriate for your network.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.13

Parameter:	**Internal Clock Speed**
Default:	64 KB
Options:	1200 B | 2400 B | 4800 B | 7200 B | 9600 B | 19200 B | 32000 B | 38400 B | 56 KB | 64 KB | 125 KB | 230 KB | 420 KB | 625 KB | 833 KB | 1.25 MB | 2.5 MB | 5 MB
Function:	Sets the clock speed of an internally supplied clock when the Clock Source parameter is set to Internal. Some routing protocol software uses this parameter value for route selection. If you configure protocol prioritization, the router uses this parameter to calculate line delay. See *Configuring Traffic Filters and Protocol Prioritization* for information about protocol prioritization, latency, and queue depth.
Instructions:	Set the clock speed for the internal clock to the desired data transmission rate across the synchronous line. You cannot set this parameter when the Clock Source parameter is set to External.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.14

Parameter:	**External Clock Speed**
Default:	64102
Range:	1200 to 6000000 bits/s
Function:	Sets the clock speed of an externally supplied clock when the Clock Source parameter is set to External. Some routing protocol software uses this parameter value for route selection. If you configure protocol prioritization, the router uses this parameter to calculate line delay. See *Configuring Traffic Filters and Protocol Prioritization* for information about protocol prioritization, latency, and queue depth.
Instructions:	Set the clock speed for the external clock to the data transmission rate that most closely corresponds to the speed of the external clock. You cannot set this parameter when the Clock Source parameter is set to Internal.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.93

Parameter:	**Signal Mode**
Default:	Balanced
Options:	Balanced | Unbalanced
Function:	Specifies balanced or unbalanced transmission. Balanced transmission uses two conductors to carry signals; unbalanced uses one conductor to carry a signal, with a ground providing the return path.
Instructions:	Set this parameter to either Balanced or Unbalanced, depending on the signaling mode of the connected device.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.15

Parameter:	**RTS Enable**
Default:	Disable
Options:	Enable | Disable
Function:	Enables or disables the detection of RTS signals on this interface.
Instructions:	Set this parameter to Enable if the connected device (for example, a modem or a KG84A cryptographic device) uses RTS/CTS flow control.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.16

Parameter:	**Burst Count**
Default:	Enable
Options:	Enable | Disable
Function:	Specifies single or multiple DMA burst cycles. If you set this parameter to Enable, the chip performs eight-word bursts. If you set this parameter to Disable, single-word burst cycles are performed. This is a performance-tuning parameter. You should set it to Enable except in certain cases with DSDE (5430 - Dual Sync, Dual Enet) and DSE (5420 - Dual Sync, Single Enet) link modules. Set it to Disable if excessive TxUflo or RxOflo errors occur on the Ethernet ports. If you have configured both SYNC ports, disable this parameter first on the SYNC interface that is either running at a lower clock speed or carries lower-priority traffic. You should only disable this parameter on both SYNC interfaces if those interfaces are DSDE configurations and you configured both Ethernet interfaces. In these configurations, disable this parameter on both SYNC interfaces if disabling it on only one interface does not eliminate the excessive TxUflo or RxOflo errors on the two Ethernet interfaces.
Instructions:	Select Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.17

Parameter:	**Service**
Default:	LLC1
Options:	Transparent | LLC1 | LAPB
Function:	Specifies the link-level protocol for this circuit. If you set this parameter to Transparent, then raw HDLC (high-level data link control) mode is in effect. LLC1 specifies connectionless datagram service; it prefixes the HDLC address and control fields to the frame.
Instructions:	Set this parameter as appropriate for this circuit. If X.25 is enabled on this line, you must set this parameter to LAPB.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.18

Parameter:	**Transmit Window Size**
Default:	1
Range:	1 to 7 frames
Function:	Controls the number of I-frames that can be transmitted without acknowledgment.
Instructions:	Either accept the default value, or enter a new value.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.27

Parameter:	**Minimum Frame Spacing**
Default:	1
Range:	1 to 32 flags
Function:	Specifies the number of flags transmitted between adjacent frames.
Instructions:	Set this parameter to the appropriate number of flags.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.29

Parameter: **Local Address**

Default: 7

Range: 1 to 255

Function: Specifies the 1-byte HDLC address of this synchronous interface, as follows

1	Address of the DCE
3	Address of the DTE
Any other value	An explicit address value

Instructions: Select an appropriate local HDLC address. Site Manager assumes that the values you enter are decimal. To enter a hexadecimal value, preface the value with 0x; for example, 0x10.

Use unique HDLC addresses for the local and remote interfaces at either end of the point-to-point circuit. If you configure a device at one end of a point-to-point connection with a local address of DCE and a remote address of DTE, you must configure the device at the other end with a local address of DTE and a remote address of DCE.

If you configure X.25 on this line, set this parameter to either 1 (DCE) or 3 (DTE).

When you send packets to this interface, use this HDLC address.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.30

Note: *Refer to "Point-to-Point Addresses," later in this chapter, for a more detailed explanation of the Local Address and Remote Address parameters.*

Parameter: **Remote Address**

Default: 7

Range: 1 to 255

Function: Specifies the 1-byte HDLC address of the remote interface, as follows:

1	Address of the DCE
3	Address of the DTE
Any other value	An explicit address value

Instructions: Select an appropriate remote HDLC address. Site Manager assumes that the values you enter are decimal. To enter a hexadecimal value, preface the value with 0x; for example, 0x10.

Use unique HDLC addresses for the local and remote interfaces at either end of the point-to-point circuit. If you configure a device at one end of a point-to-point connection with a local address of DCE and a remote address of DTE, you must configure the device at the other end with a local address of DTE and a remote address of DCE.

If you configure X.25 on this line, set this parameter to either 1 (DCE) or 3 (DTE).

When you send packets to this interface, use this HDLC address.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.31

Parameter: **WAN Protocol**

Default: None

Options: Standard │ PassThru │ PPP │ SMDS │ Frame Relay │ X.25 │ ATM DXI │ LAPB │ SDLC

Function: Indicates which WAN protocol has been enabled on this synchronous circuit.

Instructions: Accept the current value.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.34

Parameter:	**Pass Thru Local Address**
Default:	None
Options:	Any unique MAC address of exactly 12 hexadecimal digits
Function:	Assigns a MAC address to the local interface. This address becomes the source address of packets that are bridged to the destination MAC address. You assign the destination MAC address with the Pass Thru Remote Address parameter.
Instructions:	Enter a unique MAC address for the local interface, making sure that the second digit is a zero, for example, 10fffabc5432. Be sure to reverse the local and remote MAC addresses at the remote synchronous pass-through interface.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.32

Parameter:	**Pass Thru Remote Address**
Default:	None
Options:	Any unique MAC address of exactly 12 hexadecimal digits
Function:	Assigns a MAC address to the remote interface. This address becomes the destination MAC address of packets that are bridged to the local MAC address. You assign the source MAC address with the Pass Thru Local Address parameter.
Instructions:	Enter a unique MAC address for the remote interface, making sure that the second digit is a zero, for example, 10fffabc5432. Be sure to reverse the local and remote MAC addresses at the remote synchronous pass-through interface.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.33

Parameter:	**CRC Size**
Default:	16 bit
Options:	16 bit | 32 bit
Function:	Specifies an error-detection scheme. You can choose either 16-bit (standard) or 32-bit (extended) frame check sequence (FCS) to detect errors in the packet.
Instructions:	Set this parameter to either 16-bit or 32-bit.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.35

Parameter:	**Sync Media Type**
Default:	Default
Options:	Default | T1 | E1 | RAISEDTR | V25BIS | ISDN | ISDNLEASEDLINE
Function:	Specifies the signaling method that the router uses for this line.
Instructions:	Select the media type appropriate for this line.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.54

Parameter:	**Sync Polling**
Default:	Disable
Options:	Enable | Disable
Function:	Indicates whether the Data Set Ready (DSR) signal will be monitored. If you set this parameter to Enable, the synchronous driver will be enabled when the DSR is detected. When the DSR is no longer detected, the driver will be disabled. Enable this parameter only if you will be using dialup services.
Instructions:	Either accept the default or set this parameter to Enable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.76

Parameter: **Sync Line Coding**

Default: NRZ

Options: NRZ | NRZI | NRZI Mark

Function: Specifies the line coding of the physical synchronous line. On AN or ASN routers, and on a router with an Octal Sync link module, you can change the value to match the line coding of a device at the other end of the line.

NRZ	Non-Return to Zero coding
NRZI	Non-Return to Zero Inverted coding
NRZI Mark	Non-Return to Zero Inverted Mark coding

Instructions: Select the appropriate coding for this synchronous line.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.88

Note: *See "KG84A Support" for information about the KG84A parameters.*

Parameter: **Network Link Level**

Default: NET2

Options: NET2 | GOSIP | SYNC_TYPE_C03

Function: Indicates the link level for this synchronous point-to-point connection. The default is NET2. Change this parameter to GOSIP when this synchronous point-to-point connection is part of a GOSIP-compliant network (such as DOD). Change this parameter to SYNC_TYPE_C03 when you are running X.25 on a synchronous board with the MK-5025 C03 chip.

Instructions: Accept the default, NET2, or select GOSIP or SYNC_TYPE_C03.

MIB Object ID: 1.3.6.1.4.1.18.3.4.5.1.81

Parameter:	**Retry Count**
Default:	16
Range:	1 to 64 attempts
Function:	Indicates the number of retransmission attempts allowed per frame before a line is declared down.
Instructions:	Accept the default, or enter a number from 1 to 64.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.19

Parameter:	**Link Idle Timer**
Default:	9 seconds
Range:	1 to 9999 seconds
Function:	Indicates the number of seconds before a line is determined to be idle. An idle line is disabled.
Instructions:	Accept the default, or enter a number from 1 to 9999.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.20

Parameter:	**Extended Control (S and I frames)**
Default:	Disable
Options:	Enable | Disable
Function:	Allows the control fields of all S- and I- frames to become two octets in length instead of one. Numbering of all I frames becomes modulo 128 instead of modulo 8.
Instructions:	Accept the default or select Enable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.24

Parameter:	**Idle RR Frames**
Default:	Off
Options:	On | Off
Function:	Indicates whether or not the router sends a Receiver Ready (RR) signal when the Link Idle Timer expires.
Instructions:	Accept the default or select On if you want the router to send RRs.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.61

Parameter:	**Cable Type**
Default:	Null
Options:	Null | RS232 | RS422 | V35 | X21
Function:	Use only for switched-service lines. If the port is connected to a dial-up device for switched services, use this parameter to specify the cable interface type of the device.
Instructions:	Set to reflect the cable interface type that connects the dial unit if you are using one.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.83

Parameter:	**Retry Timer**
Default:	300 tenths of a second (3 seconds)
Range:	1 to 99999 tenths of a second
Function:	Indicates the time the router waits for a response from the link. The router sends Link Control frames when this timer expires, and resends the frames up to the value of the Retry Count parameter, then disconnects the link.
Instructions:	Enter a timeout value in tenths of seconds.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.21

Parameter:	**Extended Address**
Default:	Disable
Options:	Enable | Disable
Function:	Enables or disables testing of the address length. When you set this parameter to Enable, the router tests the first bit of the address to determine the length of the address, in octets.
Instructions:	Accept the default, or select Enable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.22

Parameter:	**Remote Loopback Detection**
Default:	Disable
Options:	Enable | Disable
Function:	Enables or disables Remote Loopback Detection. If BOFL is enabled, the device driver detects when it is receiving its own BOFL packets and disables the interface, assuming that the link has been put into loopback.
Instructions:	Select Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.91

Parameter:	**Sync Hold Down Time**
Default:	0 seconds
Range:	0 to 9999 seconds
Function:	Specifies a time period for the router to wait before bringing up this line when using dial services. This delay allows time for the primary line to recover, before activating a dial-up line.
Instructions:	Enter the number of seconds to wait before bringing up this line.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.80

Parameter:	**Sync Priority**
Default:	1
Range:	1 to 50
Function:	Used by dial or switched services to assign priority to lines within the same demand or backup pool. For example, the router uses a line of priority 1 before it uses a line of priority 2.
Instructions:	Assign a priority number to each line in the backup pool. The lower the number, the higher the priority.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.97

Parameter:	**Sync B Channel Override**
	Reserved for future use.

Point-to-Point Addresses

According to convention, one end of a point-to-point circuit is designated DCE and is assigned an address of 01; the other end of the circuit is designated DTE and is assigned an address of 03.

Conventional addressing, however, is inadequate in the case of multiple communication channels enabled by a common satellite link (Figure 4-2). As illustrated in Figure 4-2, a common satellite relay link provides a virtual point-to-point link between routers A and X, B and Y, and C and Z.

Conventional addressing designates routers A, B, and C as DCE (address = 01) and routers X, Y, and Z as DTE (address = 03). If router A transmits a frame across the virtual point-to-point circuit to X, X (the intended recipient), Y, and Z all monitor the satellite broadcast. Because X, Y, and Z all perceive a properly addressed frame, all three accept delivery and attempt to process the frame contents, with unpredictable results.

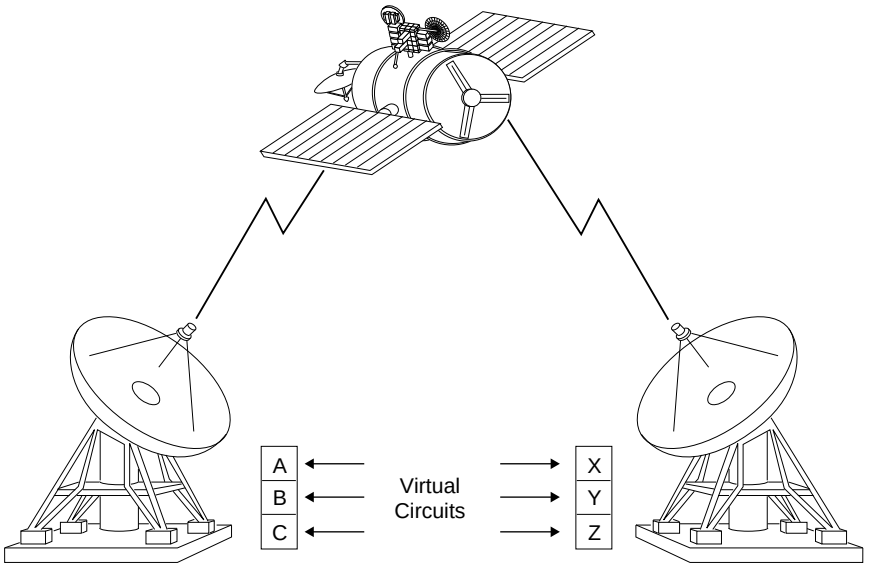

Figure 4-2. Satellite Broadcast (Sample Topology)

To avoid such confusion, assign unique addresses to each end of a point-to-point circuit using the Local Address and Remote Address parameters in the Edit SYNC Parameters window (refer to Figure 4-1). Be sure to reverse the local and remote addresses when you configure the other end of the point-to-point circuit. For example, the local address for router A becomes the remote address for router X, and the remote address for router A becomes the local address for router X.

KG84A Support

KG84A is a cryptographic device used to secure data transmitted over a point-to-point synchronous line.

Bay Networks KG84A support allows the router to use the encryption services of a KG84A device. In a KG84A configuration, the KG84A device is usually placed between the router and a modem. The KG84A device acts as the DCE for the attached router. Another KG84A device must be located at the other end of the point-to-point connection so that encrypted data can be decrypted (Figure 4-3).

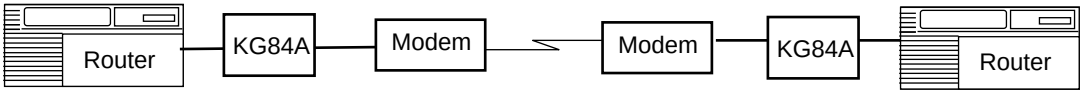

Figure 4-3. KG84A Network Configuration

The Bay Networks router attaches to the KG84A device via a modified V.35 synchronous cable. The encryption/decryption process is usually transparent to the router. However, occasionally two KG84A devices can lose cryptographic synchronization. When this occurs, the modified cable allows the router to initiate cryptographic resynchronization. The modified cable also allows the router to detect and monitor the local KG84A device resynchronization, whether the resynchronization is initiated locally or by a remote KG84A device.

The router detects the loss of synchronization between KG84A devices by monitoring the number of Frame Check Sequence (FCS) errors and valid frames received. If the router detects FCS errors, and it does not receive a valid frame within a time you specify, the router software requests resynchronization. The router also requests resynchronization if it determines that the previous resynchronization request did not complete before the time you specified.

You can also force a resynchronization of the local KG84A device by pressing its RESYNC button. The router can detect this type of remote resynchronization also, and can request a new resynchronization if one does not complete in the configured time period.

Configure KG84A support on synchronous lines that connect to KG84A cryptographic devices, using the following parameters in the Edit SYNC Parameters window (refer to Figure 4-1).

Parameter:	**KG84A Cycle**
Default:	100 milliseconds
Options:	5 | 10 | 25 | 50 | 100 | 200 | 500
Function:	Specifies the timer cycle's length, in milliseconds. This cycle value is used by the timers on the other KG84A devices on the network. This also becomes the polling cycle for monitoring FCS errors.
Instructions:	Accept the default or select one of the valid options, and be sure to set the RTS Enable parameter to Enable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.67

Parameter:	**KG84A Sync Loss Interval**
Default:	50
Options:	2 | 5 | 10 | 25 | 50 | 100 | 200 | 500
Function:	Specifies how many cycles the router should wait after detecting an FCS error to receive a valid frame before declaring that a loss of synchronization has occurred.
Instructions:	Accept the default or select one of the valid options, and be sure to set the RTS Enable parameter to Enable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.68

Parameter:	**KG84A Remote Resync Wait**
Default:	200
Options:	2 | 5 | 10 | 25 | 50 | 100 | 200 | 500
Function:	Specifies the number of cycles that the router waits for the remote KG84A device to complete a resynchronization operation, when synchronization is lost and a remotely initiated resynchronization has been detected. After this number of cycles, the router software determines that the resynchronization failed and initiates another resynchronization. Note that if you press the RESYNC button on the local KG84A device, the router responds as if it were a remotely initiated resynchronization.
Instructions:	Use different settings at each end of the point-to-point link to avoid a possible race condition, and be sure to set the RTS Enable parameter to Enable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.69

Parameter:	**KG84A Sync Pulse**
Default:	10 milliseconds
Range:	2 to 4096 milliseconds
Function:	Specifies the length of the pulse that the router transmits to the KG84A device when it is necessary to initiate KG84A resynchronization. The router uses the RTS signal of the V.35 interface, which connects to the KG84A device's SYNC signal via a special cable, to initiate KG84A resynchronization. When the router wants to initiate KG84A resynchronization, it changes the value of the SYNC signal from low to high. This parameter specifies the number of milliseconds that the SYNC signal retains its high value.
Instructions:	Accept the default or select one of the valid options, and be sure to set the RTS Enable parameter to Enable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.5.1.70

Editing LAPB Protocol Parameters

The Link Access Procedure Balanced (LAPB) protocol is a version of the high-level data link control (HDLC) protocol. Bay Networks routers use the services of LAPB to initialize the link between the router and the local DCE device, and to frame X.25 data packets before transmitting them to the DCE.

The LAPB information field contains the X.25 packets. Once an X.25 packet reaches the destination router, the LAPB protocol strips away the LAPB frame and delivers the packet to the network layer for further processing. For detailed information on X.25, refer to *Configuring X.25 Services*.

When you configure X.25 on a Bay Networks AN or ASN router, or on an Octal Sync link module line, Site Manager automatically configures LAPB.

To edit LAPB protocol parameters:

1. **Start at the Edit SYNC Parameters window (refer to Figure 4-1).**
2. **Click on LAPB.**

   The Edit LAPB Parameters window appears (Figure 4-4). Use the window's scroll bar to view all of the LAPB line parameters.

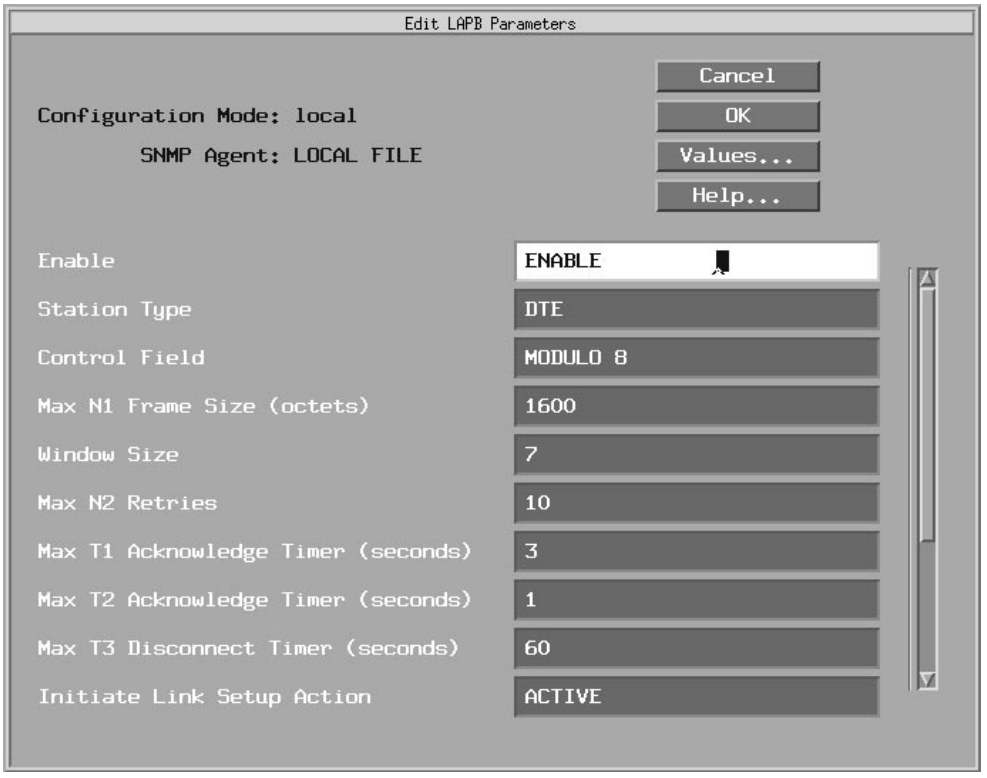

Figure 4-4. Edit LAPB Parameters Window

3. **Edit the LAPB parameters.**

   Refer to the descriptions following this procedure for guidelines.

4. **Click on OK.**

Parameter:	**Enable**
Default:	Enable
Options:	Enable | Disable
Function:	Globally enables or disables LAPB services.
Instructions:	Select Disable to disable LAPB services.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.8.1.2

Parameter:	**Station Type**
Default:	DTE
Options:	DTE | DCE | DXE
Function:	Identifies the station type, that is, whether the device is a DTE or DCE, for this interface.
Instructions:	If your device is data terminal equipment, select DTE. If your device is data communications equipment, select DCE. If you do not want to assign a specific station type, and instead want the network to determine the station type, choose DXE. This value indicates that the router is in unassigned mode; it is neither a DTE nor a DCE. If you select DXE, the router will send an exchange identification (XID), but negotiation will not take place until the network assigns a station type.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.8.1.7

Parameter:	**Control Field**
Default:	Modulo 8
Options:	Modulo 8 | Modulo 128
Function:	Specifies the desired window size, or modulo, of the sequence numbering the router uses to number frames.
Instructions:	Select the appropriate window size for your configuration.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.8.1.8

Parameter:	**Max N1 Frame Size (octets)**
Default:	1600
Range:	3 to 4500 bytes
Function:	Specifies the frame size, in bytes, for a frame that the router or network transmits. This number excludes flags and 0 bits inserted for transparency.
Instructions:	Select the frame size that suits your network configuration.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.8.1.9

Parameter:	**Window Size**
Default:	7
Range:	1 to 127
Function:	Specifies the default transmit and receive window size for the interface. This value is the maximum number of unacknowledged sequence frames that may be outstanding from the router or the network at any one time.
Instructions:	Enter the appropriate window size for your configuration.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.8.1.10

Parameter:	**Max N2 Retries**
Default:	10
Range:	1 to 64
Function:	Determines the value of the N2 retry count, which is the number of retransmission attempts that the router makes, per frame, before it considers the line to be down. The retry count is the maximum number of attempts following the expiration of the T1 timer.
Instructions:	Specify the number of times you want the router to try to retransmit.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.8.1.11

Parameter:	**Max T1 Acknowledge Timer (seconds)**
Default:	3 seconds
Range:	1 to 9999 seconds
Function:	Specifies the maximum time, in seconds, that the router waits for an acknowledgment of a frame that it has sent to the network.
Instructions:	Enter the maximum time, in seconds, that you would like the router to wait for a frame acknowledgment from the network.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.8.1.12

Parameter:	**Max T2 Acknowledge Timer (seconds)**
Default:	1 second
Range:	1 to 9999 seconds
Function:	Specifies the time, in seconds, that the router waits before sending an acknowledgment for a sequenced frame. A value of 1 means that the router does not delay before generating an acknowledgment.
Instructions:	Enter the amount of time that you want the router to wait before acknowledging a frame.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.8.1.13

Parameter:	**Max T3 Disconnect Timer (seconds)**
Default:	60 seconds
Range:	1 to 9999 seconds
Function:	Specifies the time, in seconds, that the router waits before determining that the link is disconnected. A value of 1 indicates that once the router completes the frame exchange to bring down the link, it considers the link disconnected.
Instructions:	Enter the amount of time that you want the router to wait before it decides that the link is disconnected.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.8.1.14

Parameter:	**Initiate Link Setup Action**
Default:	Active
Options:	Active | Passive
Function:	Identifies whether or not the router initiates link setup or waits for the network to initiate.
Instructions:	Enter Active if you want the router to initiate link setup, or Passive if you want the network to initiate link setup.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.8.1.16

Parameter:	**Enable Rx/Tx of XID Frames**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables the transmission and reception of test exchange identification (XID) frames by the router.
Instructions:	Select Enable to allow the router to send XID frames. Select Disable to prevent the router from sending XID frames.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.8.1.17

Parameter:	**Idle RR Frames**
Default:	Off
Options:	On | Off
Function:	Enables or disables the transmission and reception of Receiver Ready (RR) frames during periods when there are no information frame exchanges. When this parameter is set to On, an RR is transmitted when no traffic is present on the physical media.
Instructions:	Select On or Off.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.8.1.40

Parameter:	**Command/Response Address**
Default:	DTE
Options:	DTE | DCE
Function:	Specifies the local command or response address, which is the DTE or DCE value expressed as a single octet.
Instructions:	Enter DTE for the DTE address, or DCE for the DCE address.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.8.1.18

Parameter:	**WAN Protocol**
Default:	Standard
Options:	Standard | X.25
Function:	Specifies the WAN protocol you want to run on this interface.
Instructions:	Select the appropriate WAN protocol.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.8.1.20

Editing Asynchronous Line Details

On a Bay Networks AN or ASN router, the Configuration Manager displays the Edit ASYNC Parameters window (Figure 4-5) when you select the ASYNC protocol from the WAN Protocols window for a COM2 port line. Use the window's scroll bar to view all of the asynchronous line parameters.

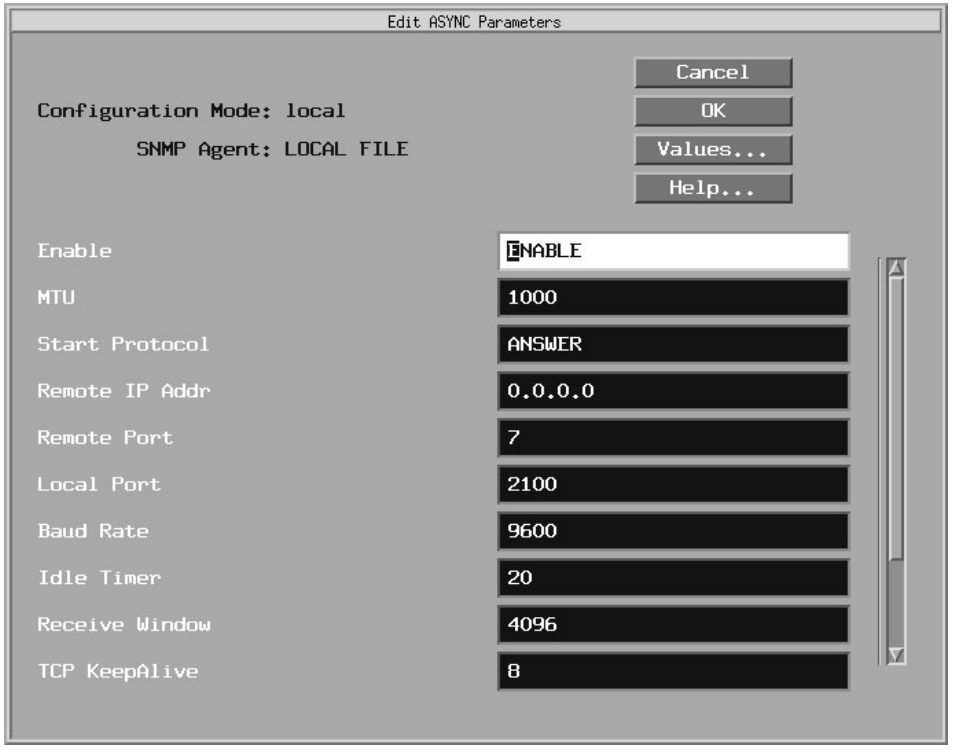

Figure 4-5. Edit ASYNC Parameters Window

To edit asynchronous line details:

1. **Edit the asynchronous line detail parameters.**

   Refer to the descriptions following this procedure for guidelines.

2. **Click on OK.**

Parameter:	**Enable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables ASYNC on the router.
Instructions:	Set this parameter to either globally enable or disable ASYNC.
MIB Object ID:	1.3.6.1.4.1.18.3.4.3.1.2

Parameter:	**MTU**
Default:	1000
Range:	3 to 1580 bytes
Function:	Specifies the largest frame (Maximum Transmission Unit) that the router can transmit via the Transmission Control Protocol (TCP).
Instructions:	Specify a value in the range 3 to 1580.
MIB Object ID:	1.3.6.1.4.1.18.3.4.3.1.7

Parameter: **Start Protocol**

Default: Answer

Options: Loop | Originate | Answer

Function: Specifies the start mode for the ASYNC TCP connection, as follows:

Answer	Advises local TCP to wait for a connection request.
Originate	Advises local TCP to initialize a connection to the specified remote IP address.
Loop	Performs ASYNC cable testing.

Instructions: Select Answer, Loop, or Originate.

MIB Object ID: 1.3.6.1.4.1.18.3.4.3.1.9

Parameter: **Remote IP Addr**

Default: None

Options: Any valid 32-bit IP address in dotted decimal notation

Function: Specifies a remote TCP host to which this router will communicate using ASYNC. The remote IP address is used only when the Start Protocol parameter is set to Originate.

Instructions: Enter a valid IP address in dotted decimal notation.

MIB Object ID: 1.3.6.1.4.1.18.3.4.3.1.26

Parameter: **Remote Port**

Default: 7

Range: 1 to 65535

Function: Specifies a remote port for the TCP connection.

Instructions: Enter a remote port number. The remote port number is used only when the Start Protocol parameter is set to Originate.

MIB Object ID: 1.3.6.1.4.1.18.3.4.3.1.27

Parameter:	**Local Port**
Default:	2100
Range:	1 to 65535
Function:	Specifies a local port on the router for ASYNC communications.
Instructions:	Enter a local port number. The local port number is used only when the Start Protocol parameter is set to Answer.
MIB Object ID:	1.3.6.1.4.1.18.3.4.3.1.28

Parameter:	**Baud Rate**
Default:	9600
Options:	300 | 1200 | 2400 | 4800 | 9600 | 19200
Function:	Specifies the ASYNC line speed.
Instructions:	Select the appropriate line speed for this configuration.
MIB Object ID:	1.3.6.1.4.1.18.3.4.3.1.29

Parameter:	**Idle Timer**
Default:	20 seconds
Range:	1 to 300 seconds
Function:	Specifies the ASYNC idle timer in seconds.
Instructions:	Enter an appropriate idle timer value in seconds.
MIB Object ID:	1.3.6.1.4.1.18.3.4.3.1.30

Parameter:	**Receive Window**
Default:	4096
Range:	512 to 65535 bytes
Function:	Specifies the size of the TCP receive window for received ASYNC packets.
Instructions:	Enter a positive value in the range 512 to 65535.
MIB Object ID:	1.3.6.1.4.1.18.3.4.3.1.31

Parameter:	**TCP KeepAlive**
Default:	8 seconds
Range:	3 to 180 seconds
Function:	Specifies how often the local TCP sends keep-alive messages to the remote TCP. The router uses this parameter with the TCP Inactive Limit parameter. When the local TCP sends out a TCP keep-alive message, it expects an acknowledgment (ACK) from the remote TCP. The ACK then resets the inactive limit timer. If the local TCP does not receive the ACK from the remote TCP within the time limit specified by the TCP Inactive Limit parameter, the TCP connection is disabled. To prevent an error or alarm condition, set the TCP Inactive Limit parameter to a value that allows enough time for multiple TCP keep-alive messages.
Instructions:	Specify a positive value in the range 3 to 180 seconds.
MIB Object ID:	1.3.6.1.4.1.18.3.4.3.1.35

Parameter:	**TCP Inactive Limit**
Default:	300 seconds
Range:	-65536 to 65535 seconds
Function:	Specifies the maximum inactivity timer in seconds. When the inactive limit timer expires, the TCP connection between the router and the remote TCP host is lost. This parameter works with the TCP KeepAlive parameter. To prevent a TCP connection loss, set this parameter to a value that allows enough time for multiple TCP keep-alive messages and ACKs from the remote TCP host. Refer to the TCP KeepAlive parameter for information. If the port is listening (TCP KeepAlive) for an incoming connection, you can specify a negative value for this parameter to mark the connection as inactive and defer resetting the connection until a connection request is received.
Instructions:	Enter a value in the range -65536 to 65535 or accept the default value (300).
MIB Object ID:	1.3.6.1.4.1.18.3.4.3.1.36

Parameter:	**Cfg TxQ Length**
Default:	None
Range:	1 to 255 bytes
Function:	Specifies the maximum transmit queue length in bytes. This parameter reduces the size of the driver transmit queue if the transmit queue is larger than the value of this parameter.
Instructions:	Enter a value in the range 1 to 255.
MIB Object ID:	1.3.6.1.4.1.18.3.4.3.1.37

Parameter:	**Cfg RxQ Length**
Default:	None
Range:	1 to 255 bytes
Function:	Specifies the maximum receive queue length in bytes. This parameter reduces the size of the driver receive queue if the receive queue is larger than the value of this parameter.
Instructions:	Enter a value in the range 1 to 255.
MIB Object ID:	1.3.6.1.4.1.18.3.4.3.1.38

Chapter 5
Configuring MCE1

This chapter describes how to use the Configuration Manager to add single-line and multiline MCE1 circuits to a Bay Networks router that contains a Multichannel E1 link module.

The last section of this chapter explains how to initiate MCE1 line tests in dynamic mode.

For each MCE1 parameter, this chapter provides information about default settings, valid parameter options, the parameter function, instructions for setting the parameter, and the MIB object ID.

The Technician Interface allows you to modify parameters by issuing **set** and **commit** commands with the MIB object ID. This process is equivalent to modifying parameters using Site Manager. For more information about using the Technician Interface to access the MIB, refer to *Using Technician Interface Software.*

Caution: *The Technician Interface does not verify that the value you enter for a parameter is valid. Entering an invalid value can corrupt your configuration.*

Adding MCE1 Circuits

Before you add MCE1 circuits, access the Configuration Manager window (Figure 5-1). Refer to *Configuring Routers* for more information on the Configuration Manager window and connectors.

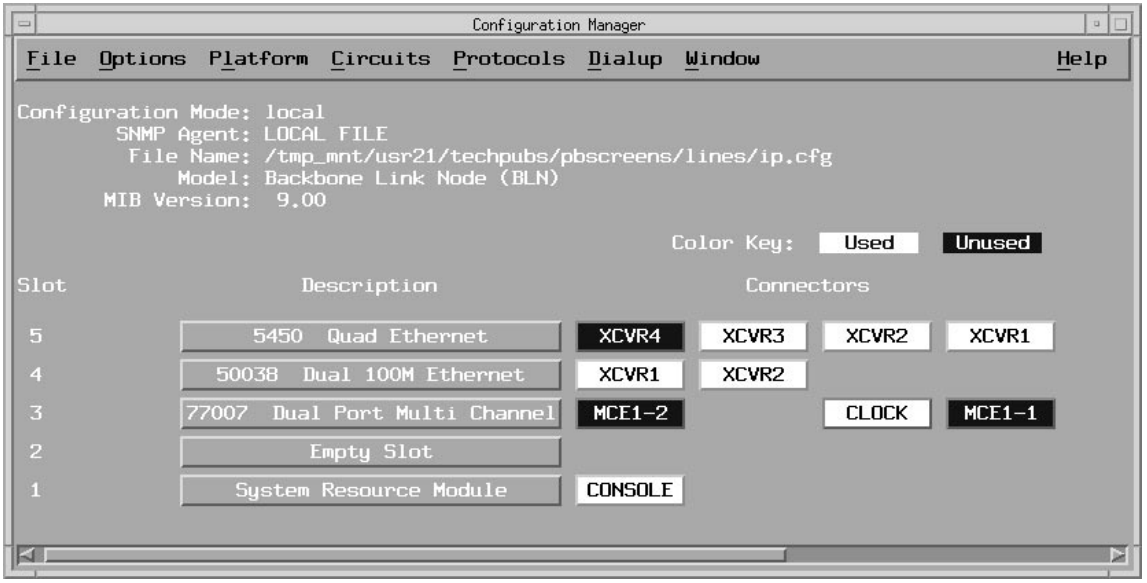

Figure 5-1. Configuration Manager Window with MCE1 in Slot 3

To add MCE1 circuits, you must

- Set clock parameters.
- Choose the port application.

Setting Clock Parameters

To set clock parameters:

1. **Start at the Configuration Manager window (refer to Figure 5-1).**
2. **Click on the CLOCK connector for the MCE1 module.**

   The Edit Slot DS1/E1 Clock Parameters window appears (Figure 5-2).

Note: *The titles of MCE1 windows indicate the slot number of the MCE1 link module.*

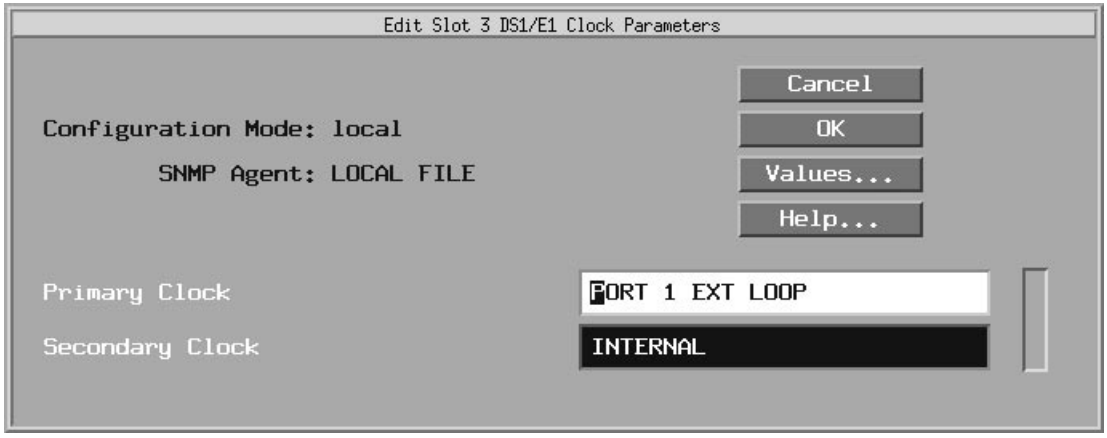

Figure 5-2. Edit Slot DS1/E1 Clock Parameters Window

The clock parameters define the timing sources that apply globally to all ports and DS0 timeslots that the MCE1 link module supports.

One clock chip on the link module provides the timing signals for all ports. The clock parameters you set for the first port apply to all subsequent ports.

3. **Select new values for the clock parameters that you want to edit.**

   Use the descriptions that follow as guidelines.

4. **Click on OK.**

Parameter: **Primary Clock**

Default: Port 1 Ext Loop

Options: Internal | Port 1 Ext Loop | Port 2 Ext Loop | Auxiliary Ext

Function: Identifies the primary source of the timing signals, as follows:

Internal	Uses the clock chip on the link module
Port 1 Ext Loop	Uses the signal coming in from Port 1
Port 2 Ext Loop	Uses the signal coming in from Port 2
Auxiliary Ext	Uses an external source via the BNC connector

Instructions: Specify the source of the primary transmit clock.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.1.1.4

Parameter: **Secondary Clock**

Default: Internal

Options: Internal | Port 1 Ext Loop | Port 2 Ext Loop | Auxiliary Ext

Function: Identifies the secondary source of the timing signals, as follows:

Internal	Uses the clock chip on the link module
Port 1 Ext Loop	Uses the signal coming in from Port 1
Port 2 Ext Loop	Uses the signal coming in from Port 2
Auxiliary Ext	Uses an external source via the BNC connector

The router uses the secondary clock only when the primary clock becomes unavailable.

Instructions: Specify the source of the secondary transmit clock.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.1.1.5

Selecting the Port Application

To select the port application:

1. **Start at the Configuration Manager window (refer to Figure 5-1).**
2. **Click on an MCE1 connector.**

   The Port Application window appears (Figure 5-3).

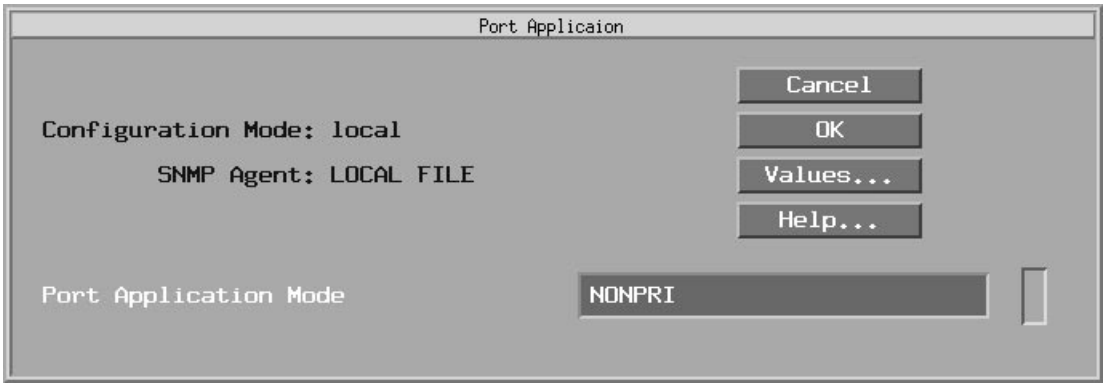

Figure 5-3. Port Application Window

3. **Edit the Port Application Mode parameter.**

   Use the description that follows as a guideline.
4. **Click on OK.**

   The MCE1 Port Parameters window appears (Figure 5-4).

Parameter: **Port Application Mode**

Default: NONPRI

Options: NONPRI | PRI

Function: Specifies the application that the logical lines of this port provide, as follows:

NONPRI	Indicates that all the lines have a permanent circuit number and are for leased lines, Frame Relay, or permanent connections for other non-ISDN PRI applications
PRI	Indicates that the lines are for switched circuits using ISDN

Instructions: Select NONPRI or PRI.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.3.1.16

Note: *If you are configuring an MCE1-I module, Site Manager displays a warning indicating that this version of MCE1 does not support ISDN. You must configure non-PRI applications for MCE1-I ports.*

Configuring the MCE1 Port

The port parameters apply to each of the 31 DS0 channels (timeslots) that an individual MCE1 port (connector) provides.

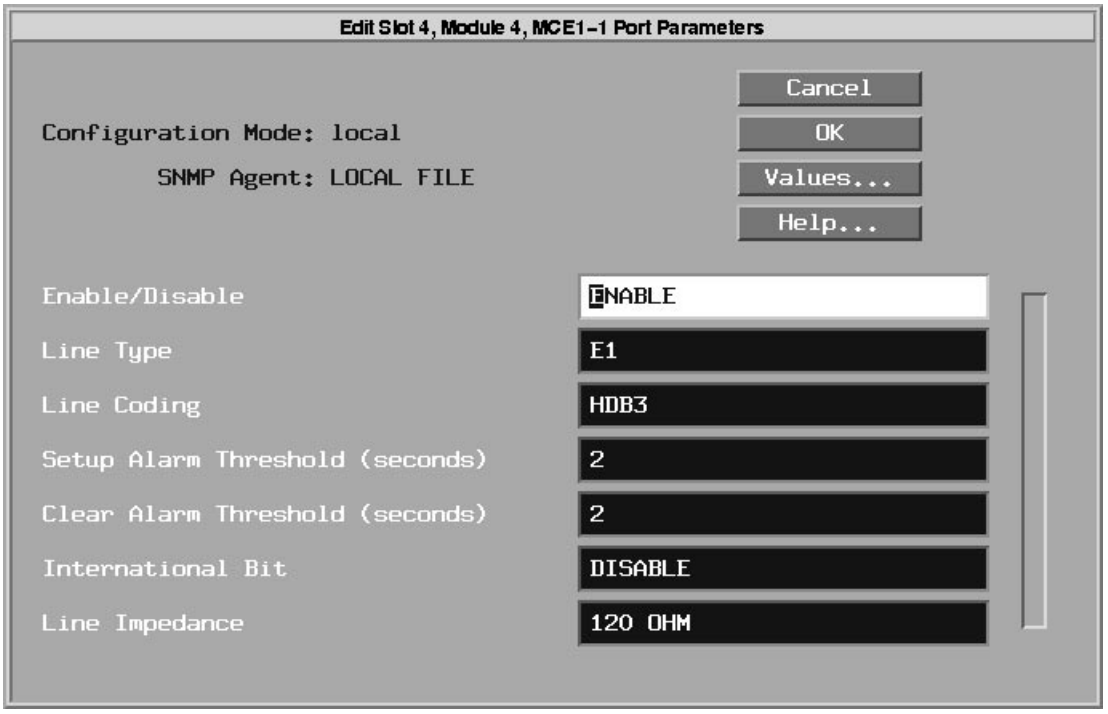

Figure 5-4. MCE1 Port Parameters Window

To edit MCE1 port parameters:

1. **Select new values for the port parameters that you want to edit.**

   Refer to the descriptions following this procedure for guidelines.

2. **Click on OK.**

Parameter:	**Enable/Disable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables the MCE1 port.
Instructions:	Set to Disable only if you want to disable the MCE1 port.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.3.1.2

Parameter:	**Line Type**
Default:	E1
Options:	E1 | E1 CRC | E1 MF | E1 CRC MF
Function:	Specifies the framing format.
Instructions:	Select the appropriate frame format for your E1 equipment.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.4.1.6

Parameter:	**Line Coding**
Default:	HDB3
Options:	T34AMI | HDB3
Function:	Specifies a line coding method. AMI line coding is bipolar: a binary 0 is transmitted as zero volts and a binary 1 is transmitted as either a positive or negative pulse, opposite in polarity to the previous pulse. (When configured for AMI line coding, the MCE1 link module remains synchronized upon receiving up to 45 consecutive 0s.) HDB3 (High-Density Bipolar Coding) line coding maintains sufficient 1s density within the E1 data stream. It replaces a block of eight consecutive binary 0s with an 8-bit HDB3 code containing bipolar violations in the fourth and seventh bit positions of the substituted code. In the receive direction, the HDB3 code is detected and replaced with eight consecutive binary 0s.
Instructions:	Specify the line coding method.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.4.1.7

Parameter:	**Setup Alarm Threshold (seconds)**
Default:	2 seconds
Range:	2 to 10 seconds
Function:	Specifies the time interval during which MCE1 tolerates a performance defect or anomaly. If the performance defect or anomaly is still present when this time interval expires, MCE1 records a performance failure and logs an event message.
Instructions:	Set the timer value.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.3.1.7

Parameter:	**Clear Alarm Threshold (seconds)**
Default:	2 seconds
Range:	2 to 10 seconds
Function:	Specifies the clear time for performance failure conditions. If the defect or anomaly clears within this time interval, MCE1 records a performance-cleared condition and logs an event message.
Instructions:	Set the timer value.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.3.1.8

Parameter:	**International Bit**
Default:	Disable
Options:	Enable | Disable
Function:	Specifies whether or not to set the international bit in the E1 frame.
Instructions:	Select Enable to set the international bit, or select Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.3.1.15

Parameter:	**Line Impedance**
Default:	120 Ohm
Options:	120 Ohm | 75 Ohm
Function:	Specifies Line impedance for the ASN MCE1 net module. This parameter only appears for the ASN MCE1 module.
Instructions:	Set the line impedance.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.3.1.20

Configuring Non-PRI Circuits

After you set port parameters for a non-PRI circuit and click on OK in the MCE1 Port Parameters window (refer to Figure 5-4), the MCE1 Logical Lines window appears (Figure 5-5). Logical lines are the logical paths for data communications on a physical connection.

To add MCE1 logical lines:

- Add a circuit for each logical line.
- Define logical lines.
- Group lines into a multiline circuit (optional).
- Complete the logical line parameters.
- Assign timeslots.
- Save your changes.

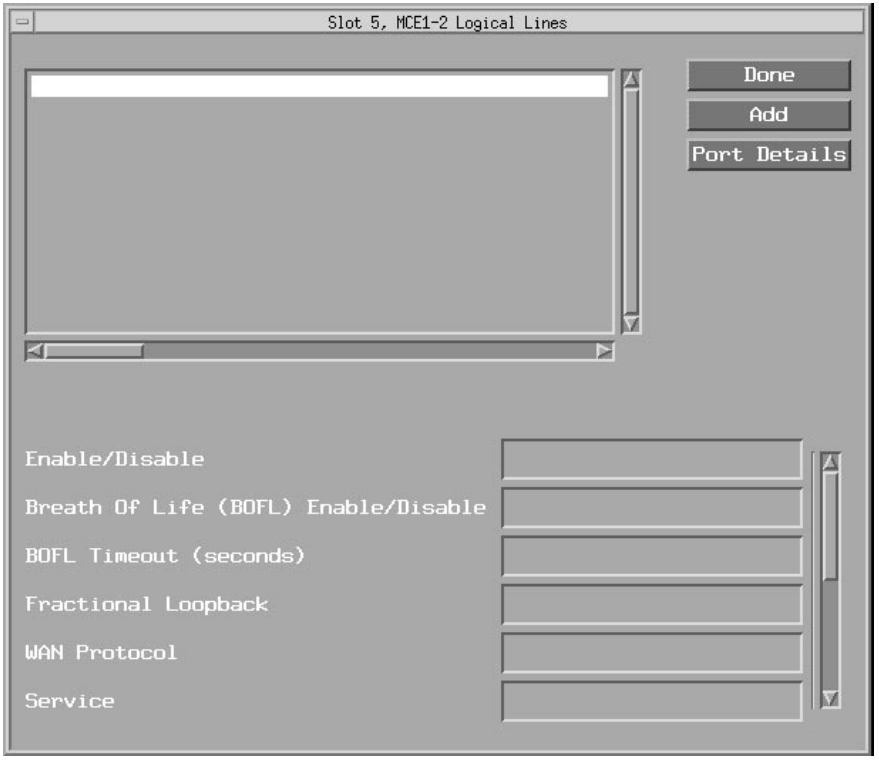

Figure 5-5. MCE1 Logical Lines Window before Defining a Circuit

Adding Circuits for and Defining Logical Lines

To add a circuit for each logical line and define logical lines:

1. **Start at the MCE1 Logical Lines Window (refer to Figure 5-5).**
2. **Click on Add.**

   The Add Circuit window appears (Figure 5-6).

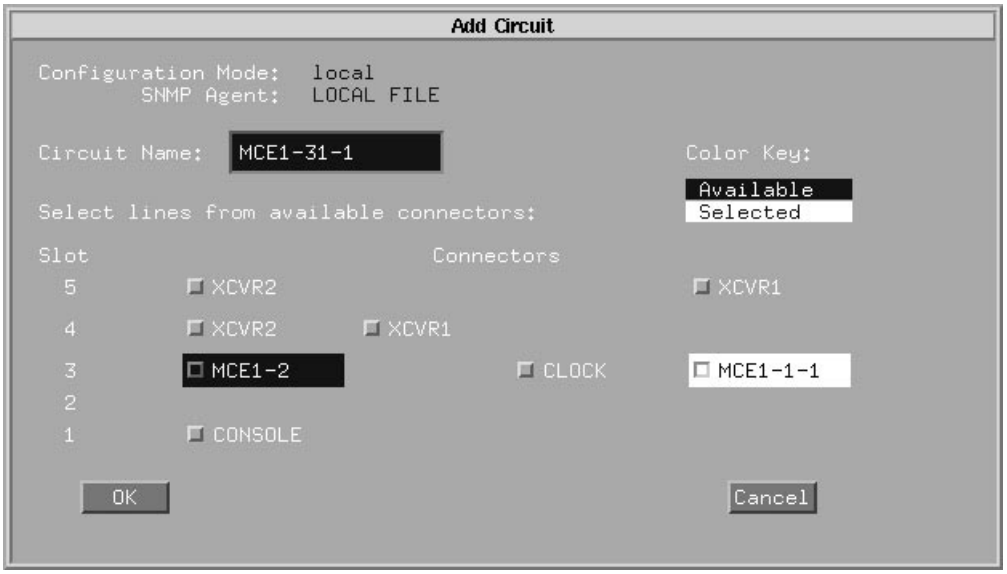

Figure 5-6. Add Circuit Window

3. **Name the logical line's circuit.**

   You can use the default circuit name that appears in the Add Circuit window, or change the name by clicking on the Circuit Name box and typing in a new name.

   Figures 5-7 and 5-8 illustrate how Site Manager generates the default circuit name. The default name identifies the circuit type (MCE1), the physical connector (slot and port number), the number of the logical line on the MCE1 port associated with the circuit, and in the case of the MCE1 ASN module, the module number.

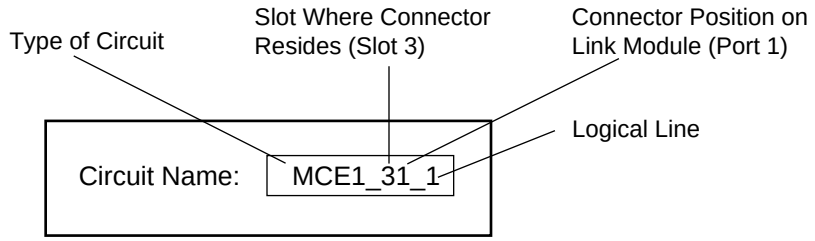

Figure 5-7. Default Circuit Name for MCE1 Link Modules

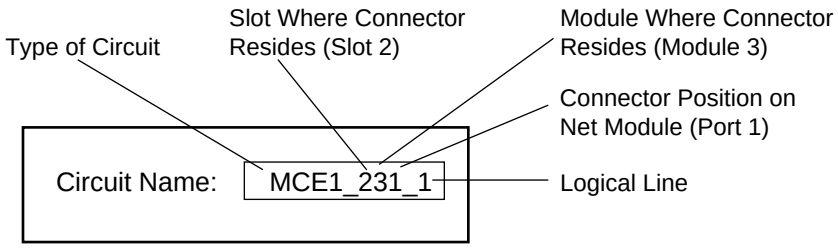

Figure 5-8. Default Circuit Name for ASN MCE1 Net Modules

4. **Click on OK.**

   The WAN Protocols window appears. Refer to *Configuring Routers* and the appropriate protocol configuration guide for information about selecting WAN protocols.

5. **Select the WAN protocol and click on OK.**

   The Select Protocols window appears.

6. **Select the protocols to run on this logical line.**

   Refer to *Configuring Routers* and the appropriate protocol configuration guide for instructions. When you have finished, the MCE1 Logical Lines window appears, showing the first MCE1 circuit (Figure 5-9).

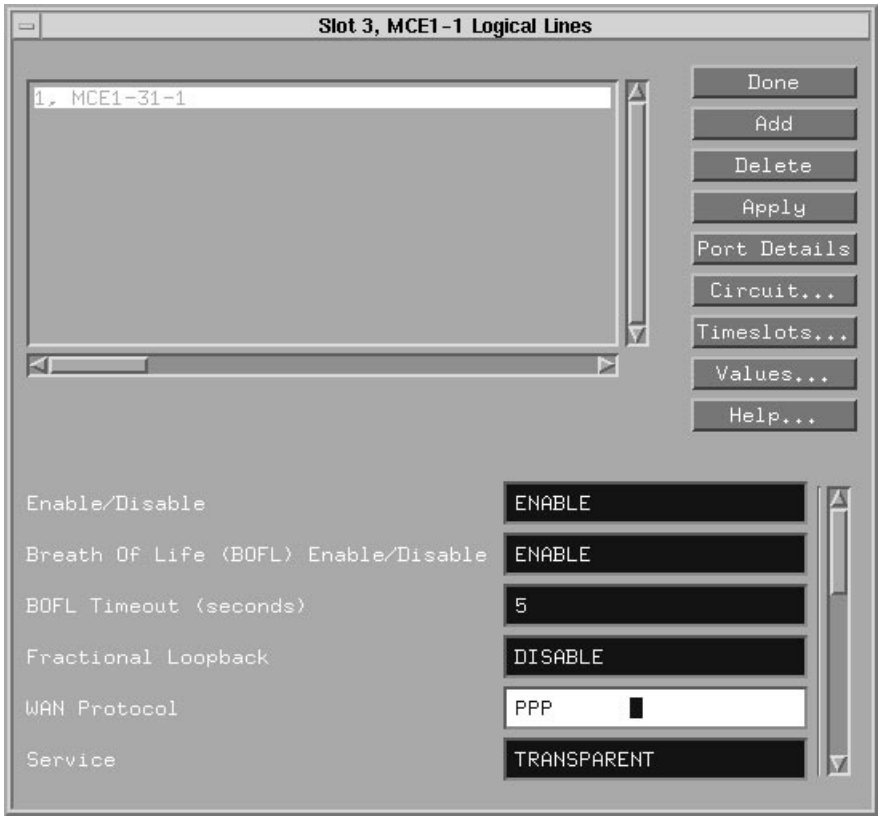

Figure 5-9. MCE1 Logical Lines Window with One Circuit Defined

7. **Repeat Steps 2 through 6 for each circuit that you want to create.**

   A single MCE1 port supports up to 31 logical lines. Each logical line supports one circuit.

Grouping Lines into a Multiline Circuit

This section describes how to group multiple unused MCE1 logical lines into one multiline circuit. An unused logical line is one without a defined circuit. You can group as many as 31 logical lines into one multiline circuit. All logical lines in a multiline group have the same circuit name. See Chapter 7 for detailed information about multiline services.

Note: *If you do not want to group the MCE1 logical lines into a multiline circuit, go to "Configuring the Logical Line," later in this chapter.*

Before you can group the lines, you must create the unused logical lines. To create unused lines:

1. **Start at the MCE1 Logical Lines window (refer to Figure 5-9).**
2. **Click on Add.**

   The Add Circuit window appears (refer to Figure 5-6).
3. **Click on Cancel.**

   Clicking on OK adds a circuit for this line. Clicking on Cancel creates an unused logical line. The unused logical line will be the next available logical line, represented by a number from 1 to 31.

   The MCE1 Logical Lines window reappears (Figure 5-10).
4. **Repeat Steps 2 and 3 for each unused logical line that you want to create.**

   The MCE1 Logical Lines window now lists the unused logical lines. Figure 5-10 shows three unused logical lines.

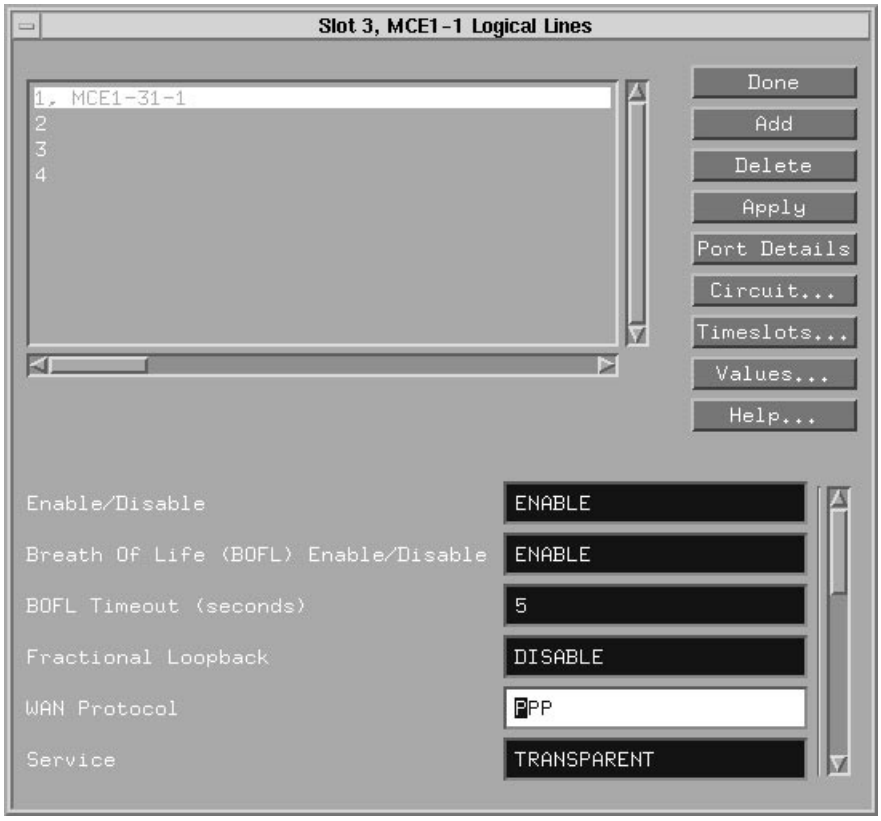

Figure 5-10. MCE1 Logical Lines Window with Unused Logical Lines

To group lines into a multiline group:

1. **Highlight the circuit that you want to include in a multiline group.**

   Figure 5-10 shows Logical Line 1 with circuit name MCE1-31-1 highlighted.

2. **Click on Circuit.**

   The Circuit Definition window appears (Figure 5-11).

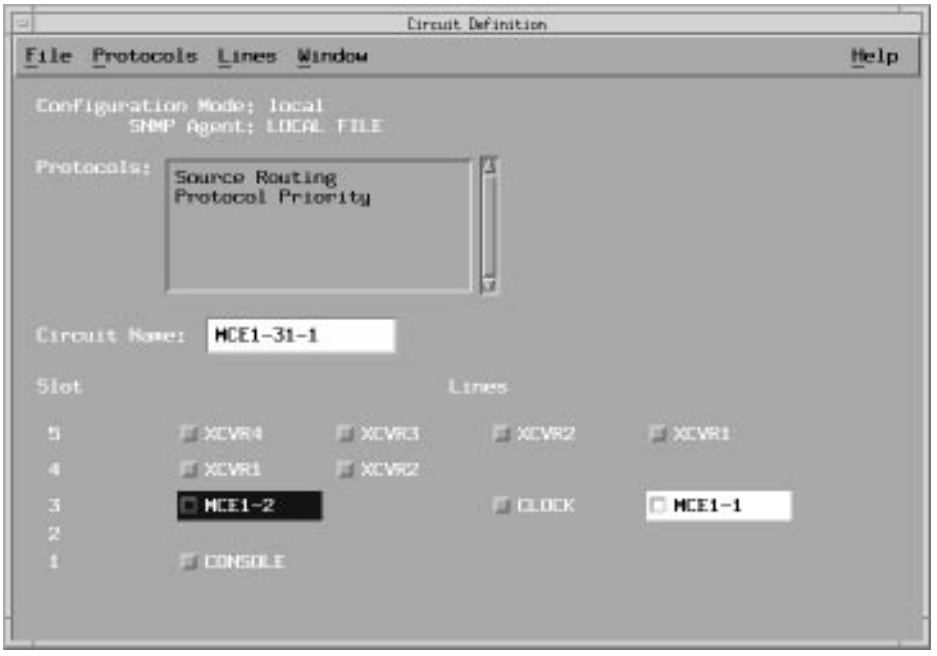

Figure 5-11. Circuit Definition Window

3. **Click on the connector that has the unused logical lines.**

   The Select Logical Line window appears (Figure 5-12), displaying the lowest-numbered unused logical line.

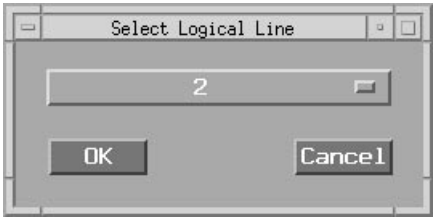

Figure 5-12. Select Logical Line Window

4. **Click on and hold down the logical line number (Figure 5-13).**

   The Select Logical Lines window displays any additional unused logical lines.

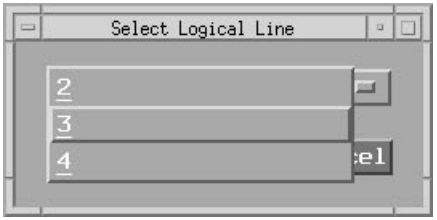

Figure 5-13. Selecting an Unused Logical Line

5. **Select a logical line you want to include in the multiline circuit.**
6. **Click on OK.**

   The Circuit Definition window appears.
7. **Select Lines→Change Lines.**
8. **Select Lines→Change Lines again to see if the Multiline option is now available for this circuit (Figure 5-14).**

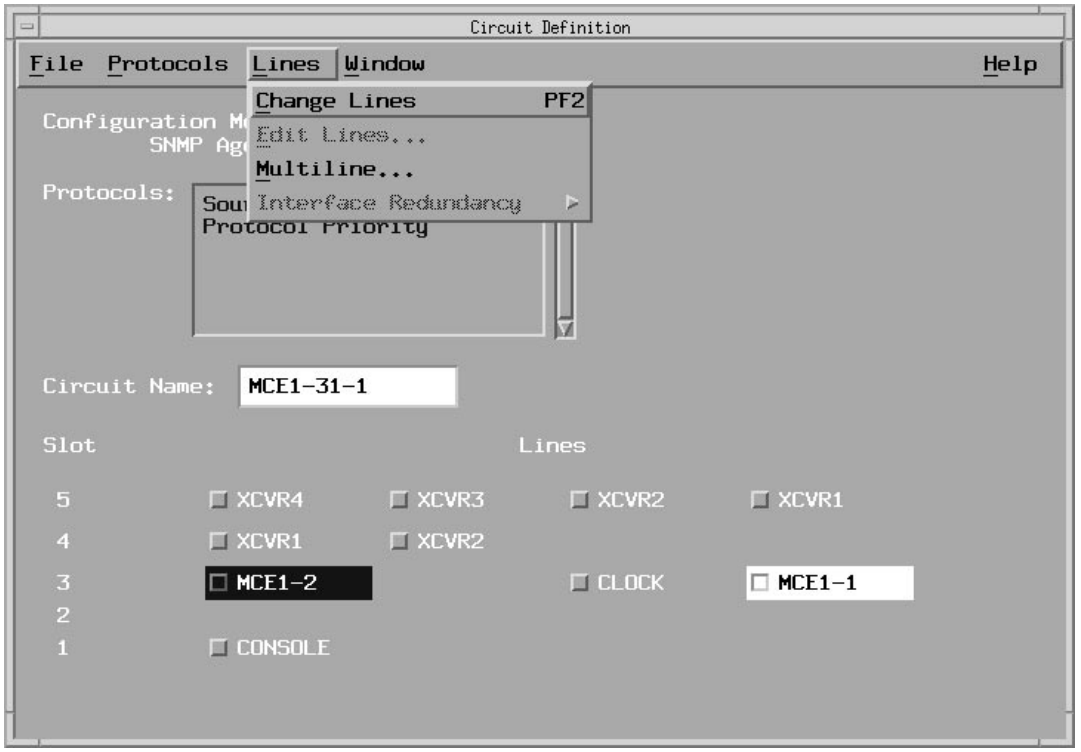

Figure 5-14. Selecting Change Lines from the Circuit Definition Window

9. **Repeat Steps 3 through 7 for each unused logical line that you want to include in the multiline circuit.**

   These logical lines are now grouped as a circuit.

10. **Select File→Exit.**

    The MCE1 Logical Lines window appears, displaying a multiline group (Figure 5-15). Note that all logical lines now have the same circuit name, MCE1-31-1.

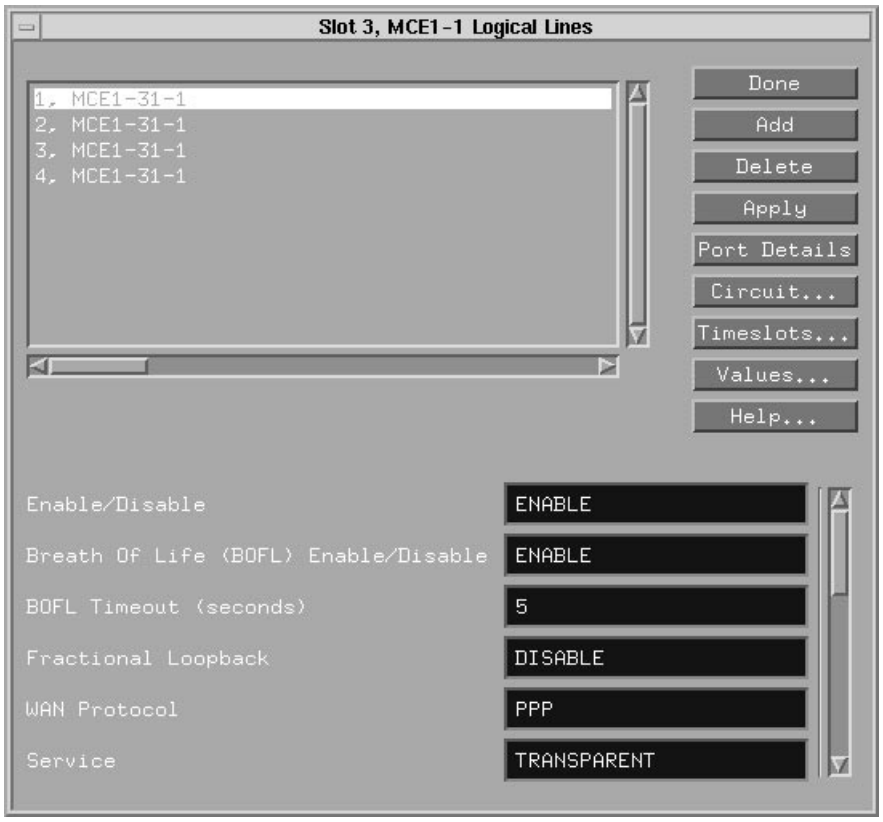

Figure 5-15. MCE1 Logical Lines Window with a Multiline Circuit Defined

Configuring the Logical Line

After you finish adding a non-PRI circuit to a logical line, the MCE1 Logical Lines window (refer to Figure 5-15) displays a configured circuit name next to each logical line. This window also displays the parameter values for the highlighted logical line.

Use the scroll bar in the MCE1 Logical Lines window to view additional logical line parameters.

To edit parameters for a logical line:

1. **Select the line and circuit name from the logical line list.**

   Site Manager displays the circuit's parameters.

2. **Edit the parameters you want to change.**

   Refer to the following descriptions for guidelines.

3. **Click on Apply.**

Parameter:	**Enable/Disable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables the logical line.
Instructions:	Select Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.2

Parameter:	**Breath of Life (BOFL) Enable/Disable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables the transmission of BOFL packets. When you set this parameter to Enable, a BOFL packet is sent out on the wire as often as the value you specify for the BOFL Timeout parameter.
Instructions:	Select Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.8

Parameter:	**BOFL Timeout (seconds)**
Default:	5 seconds
Range:	1 to 60 seconds
Function:	Indicates the time period between Breath of Life packets.
Instructions:	Set the time between BOFL packets in seconds.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.9

Parameter:	**Fractional Loopback**
Default:	Disable
Options:	Enable | Disable
Function:	Specifies whether or not to use diagnostic loopback mode on this circuit. In this mode, the router retransmits received data to the sender.
Instructions:	Select Enable only if you want the port in loopback mode.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.10

Parameter:	**WAN Protocol**
Default:	Standard
Options:	Standard | PPP | SMDS | Frame Relay
Function:	Specifies the WAN protocol you configured for this logical line.
Instructions:	Accept the current value.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.14

Parameter:	**Service**
Default:	LLC1
Options:	Transparent | LLC1
Function:	Sets the HDLC service type for this line. Transparent is basic HDLC mode. LLC1 adds the HDLC address and control fields as a prefix to the frame.
Instructions:	Select the logical line HDLC service.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.15

Parameter: **Local HDLC Address**

Default: 7

Range: 1 to 255

Function: Specifies the 1-byte HDLC address of this MCE1 interface, as follows:

1	Address of the DCE
3	Address of the DTE
Any other value	An explicit address value

Instructions: Select an appropriate local HDLC address. Site Manager assumes that the values you enter are decimal. To enter a hexadecimal value, preface the value with 0x; for example, 0x10.

Use unique HDLC addresses for the local and remote interfaces at either end of the point-to-point circuit. If you configure a device at one end of a point-to-point connection with a local address of DCE and a remote address of DTE, you must configure the device at the other end with a local address of DTE and a remote address of DCE.

If you configure X.25 on this line, set this parameter to either 1 (DCE) or 3 (DTE).

When you send packets to this interface, use this HDLC address.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.16

Parameter: **Remote HDLC Address**

Default: 7

Range: 1 to 255

Function: Specifies the 1-byte HDLC address of the remote MCE1 interface, as follows:

1	Address of the DCE
3	Address of the DTE
Any other value	An explicit address value

Instructions: Select an appropriate remote HDLC address. Site Manager assumes that the values you enter are decimal. To enter a hexadecimal value, preface the value with 0x; for example, 0x10.

Use unique HDLC addresses for the local and remote interfaces at either end of the point-to-point circuit. If you configure a device at one end of a point-to-point connection with a local address of DCE and a remote address of DTE, you must configure the device at the other end with a local address of DTE and a remote address of DCE.

If you configure X.25 on this line, set this parameter to either 1 (DCE) or 3 (DTE).

When you send packets to this interface, use this HDLC address.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.17

Parameter: **Rate Adaptation**

Default: 64 K LSB

Options: 64 K │ 56 K MSB │ 56 K LSB

Function: Determines the number of bits and their bit positions within the timeslot. The 64 K selection uses all 8 bits in the timeslot. The two 56 K selections use 7 of the 8 bits in the timeslot. The 56 K MSB selection does not use the most significant bit, and the 56 K LSB selection does not use the least significant bit in the timeslot.

Instructions: Select the line rate adaptation.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.18

Parameter:	**Interframe Time Fill Character**
Default:	Flags
Options:	Flags | Idles
Function:	Specifies the interframe time-fill pattern for transmission across this circuit. Flags selects an 0x7E pattern (0 1 1 1 1 1 1 0); Idles selects an 0xFF pattern (1 1 1 1 1 1 1 1).
Instructions:	Set the line interframe time-fill character.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.19

Parameter:	**CRC Size**
Default:	16 bit CRC
Options:	32 bit CRC | 16 bit CRC
Function:	Specifies the Cyclic Redundancy Check (CRC) type. With 16-bit CRC, the router appends a 16-bit CRC to the transmitted frames and performs a 16-bit CRC on received frames. With 32-bit CRC, the router appends a 32-bit CRC to transmitted frames and performs a 32-bit CRC on received frames.
Instructions:	Set the CRC size.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.20

Parameter:	**MTU Size (bytes)**
Default:	1600
Range:	3 to 4608 bytes
Function:	Specifies the transmit/receive buffer size (Maximum Transmission Unit) to configure the largest frame that the router can transmit or receive across this MCE1 port. The router discards frames larger than this value.
Instructions:	Enter a value in the range 3 to 4608 bytes.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.55

Assigning Timeslots

After setting up the logical lines, you must assign timeslots (also called *channels* or *DS0*s) for each circuit. To assign timeslots:

1. **Start at the MCE1 Logical Lines window (refer to Figure 5-15).**
2. **Click on Timeslots.**

   The MCE1 Timeslots window appears (Figure 5-16). This window graphically represents the 31 timeslots.

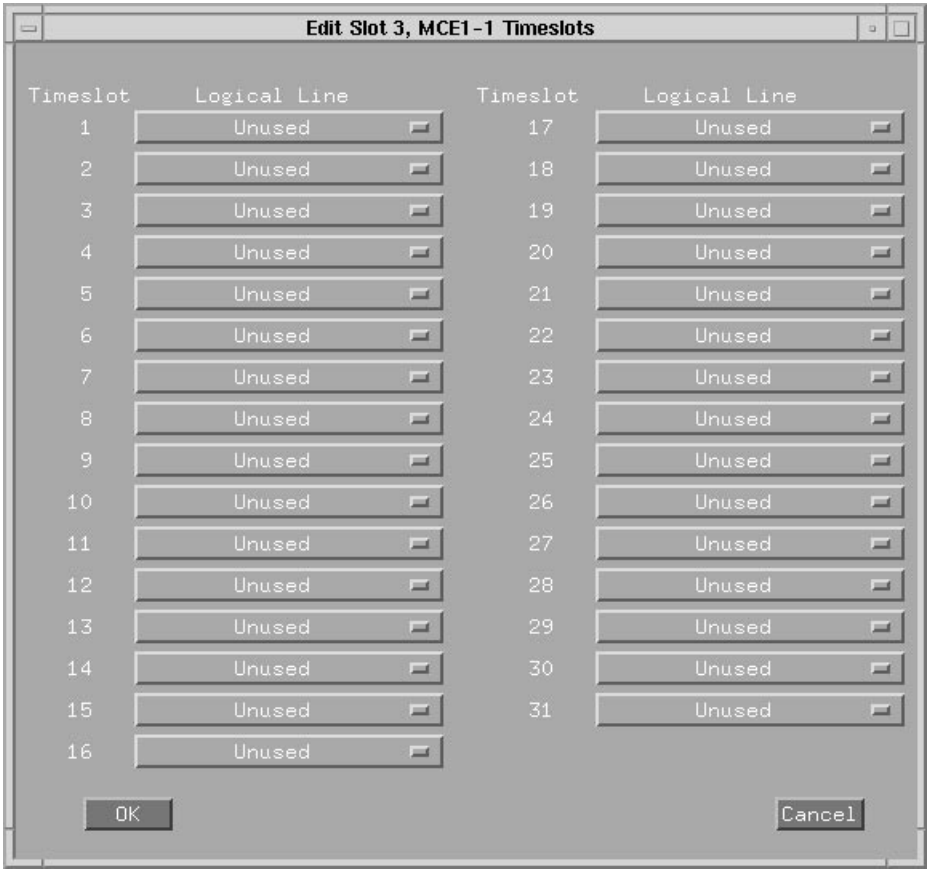

Figure 5-16. MCE1 Timeslots Window

3. **Click on a timeslot.**

   A list of possible circuits to which you can assign the timeslot appears (Figure 5-17).

Note: *Timeslot 16 is unavailable when the Line Type parameter in the MCE1 Port Parameters window (refer to Figure 5-4) is set to E1 MF or E1 CRC MF.*

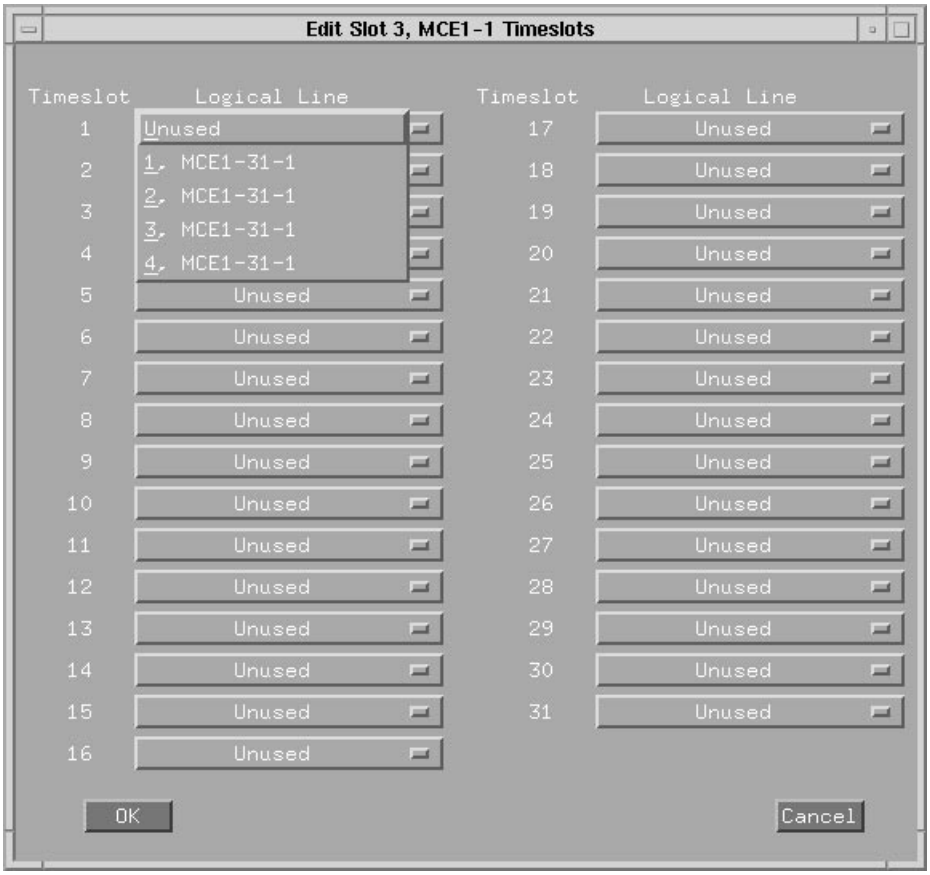

Figure 5-17. Assigning a Timeslot

4. **Select the circuit to which you want to assign the timeslot.**
5. **Repeat Steps 3 and 4 for each timeslot you want to assign.**

6. **Click on OK.**

   The MCE1 Logical Lines window appears (refer to Figure 5-15).

Saving Your Changes

To save the changes you have made to the MCE1 Logical Lines window (refer to Figure 5-15):

1. **Click on Apply.**
2. **Click on Done.**

   The Configuration Manager window appears (refer to Figure 5-1).

Configuring MCE1 ISDN PRI Circuits

After you set port parameters for a PRI circuit and click on OK in the MCE1 Port Parameters window (refer to Figure 5-4), the MCE1 PRI Logical Lines window appears (Figure 5-18). A few seconds later, the MCE1 Timeslots window appears (Figure 5-19).

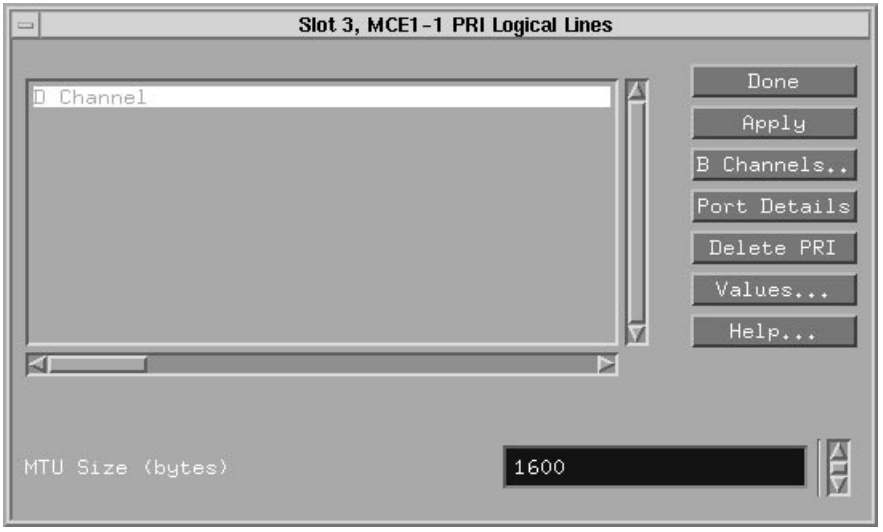

Figure 5-18. MCE1 PRI Logical Lines Window (ISDN PRI Configurations)

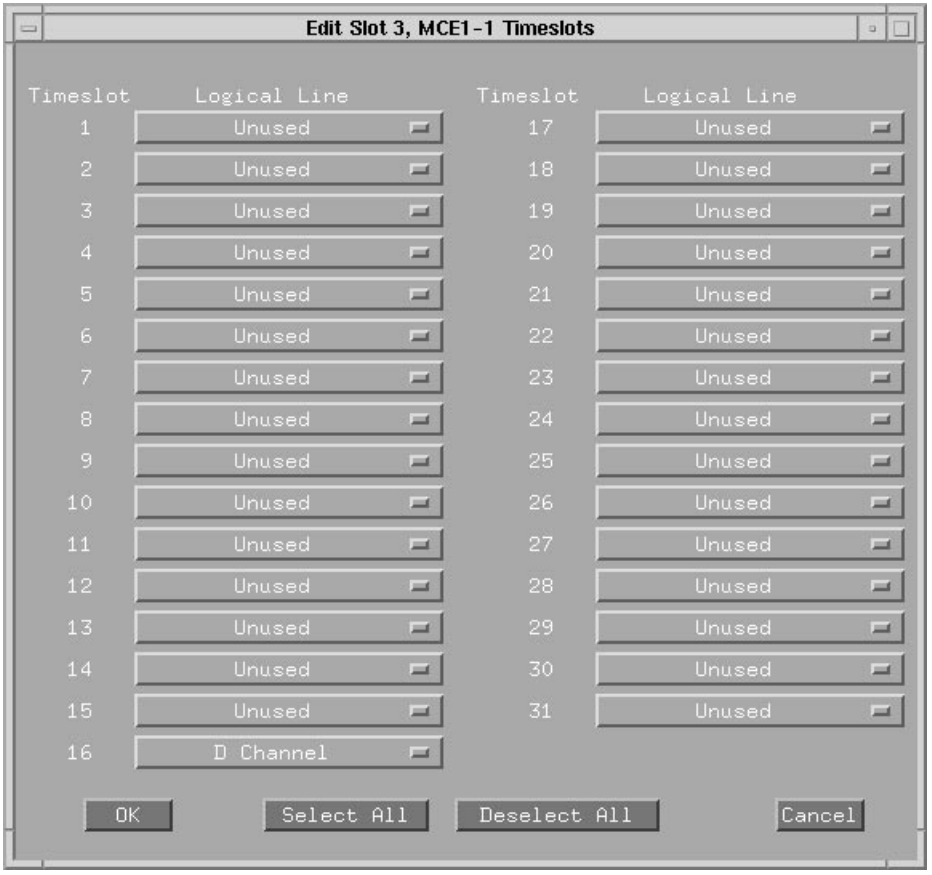

Figure 5-19. MCE1 Timeslots Window (ISDN PRI Configurations)

Follow the steps in this section to

- Assign timeslots.
- Edit the logical line parameter.
- Save your changes.

Assigning Timeslots

To assign the timeslots (also called *channels* or *DS0*s) for each ISDN PRIcircuit:

1. **Start at the MCE1 Timeslots window (refer to Figure 5-19).**

   The MCE1 Timeslots window graphically represents the 31 timeslots.

2. **Click on a timeslot.**

   Site Manager displays a list of circuits to which you can assign the timeslot.

Note: *Timeslot 16 is unavailable when the Line Type parameter in the MCE1 Port Parameters window (refer to Figure 5-4) is set to E1 MF or E1 CRC MF.*

3. **Select the circuit to which you want to assign the timeslot.**
4. **Repeat Steps 2 and 3 for each timeslot you want to assign.**
5. **Click on OK.**

   The MCE1 PRI Logical Lines window appears (refer to Figure 5-18).

Editing the B-Channel Logical Line Parameter

To modify the B-Channel line:

1. **Start at the MCE1 PRI Logical Lines window (refer to Figure 5-18).**
2. **Select the line and circuit name from the logical line list.**

   Site Manager displays the circuit's MTU.

3. **Edit the MTU Size (byte) paramater.**

   Use the parameter description that follows as a guidelines.

4. **Click on Apply.**

Parameter:	**MTU Size (bytes)**
Default:	1600
Range:	3 to 4608 bytes
Function:	Specifies the transmit/receive buffer size (Maximum Transmission Unit) to configure the largest frame that the router can transmit or receive across this MCE1 port. The router discards frames larger than this value.
Instructions:	Enter a value in the range 3 to 4608 bytes.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.55

Saving Your Changes

To save the changes you have made to the MCE1 PRI Logical Lines window:

1. **Click on Apply.**
2. **Click on Done.**

   The Configuration Manager window appears (refer to Figure 5-1).

Testing MCE1 Lines

While in dynamic mode, you can use the Configuration Manager to trigger MCE1 port actions to test the quality of the line. MCE1 line tests include

- Transmitting specific codes to the remote end of the MCE1 connection
- Introducing deliberate error patterns into the transmitted BERT (Bit Error Rate Test) bit stream

All actions are MCE1 port-specific. For example, a BERT reset action resets the port-specific series of BERT counters.

The BERT statistics show the results of your actions. You can view BERT statistics using the Statistics Manager utility. For information on the Statistics Manager, see *Managing Routers and BNX Platforms*.

Caution: *Initiating line tests affects all logical lines associated with that port for the duration of the testing.*

Setting the Test Parameters

Before you test the line, you must set the test parameters.

To set the test parameters:

1. **Start at the MCE1 Logical Lines window (refer to Figure 5-15).**
2. **Click on Port Details.**

   The MCE1 Port Parameters window appears (Figure 5-20).

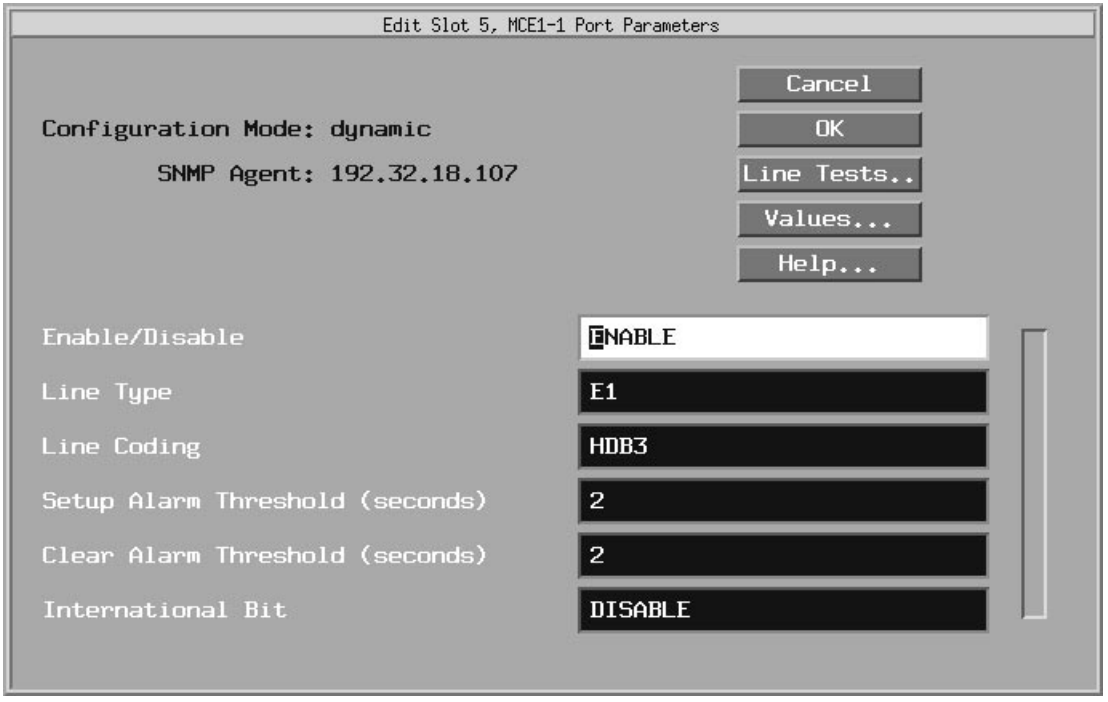

Figure 5-20. MCE1 Port Parameters Window in Dynamic Mode

3. **Click on Line Tests.**

   The Line Tests option appears only in dynamic mode.

   The MCE1 Port Actions window appears (Figure 5-21).

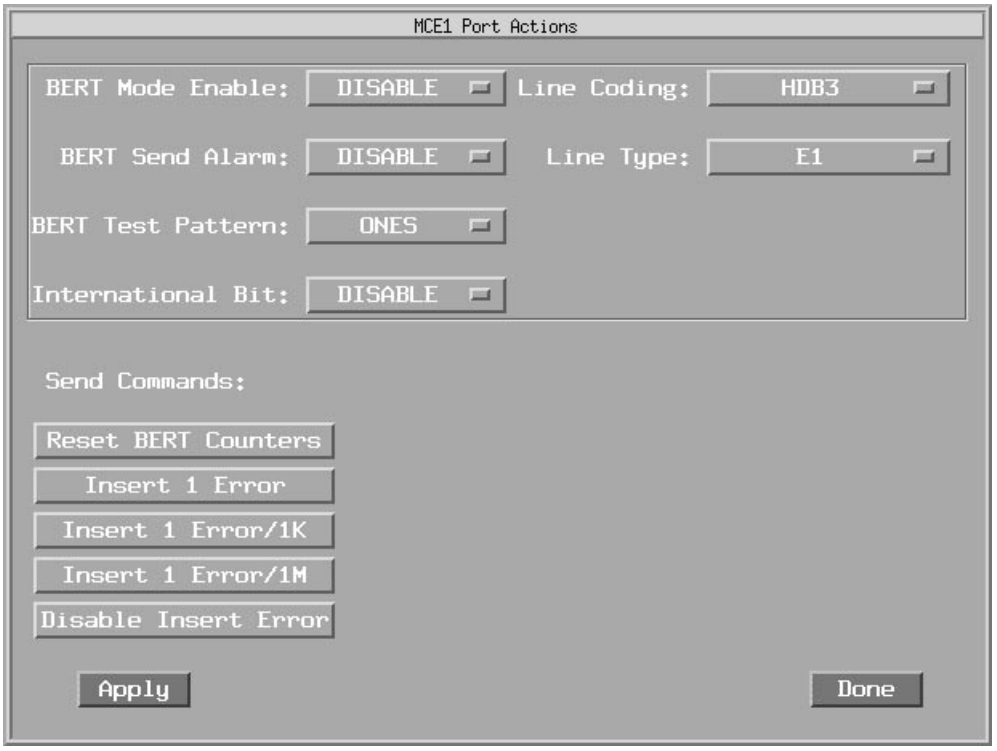

Figure 5-21. MCE1 Port Actions Window

4. **Edit the MCE1 port action parameters.**

   Refer to the following descriptions for guidelines.

Parameter:	**BERT Mode Enable**
Default:	Disable
Options:	Enable | Disable
Function:	Selecting Enable activates BERT mode.
Instructions:	To enter BERT mode, select Enable and click on Apply.
MIB Object ID:	1.3.6.1.4.1.18.3.4.8.2.1.6

Parameter:	**BERT Send Alarm**
Default:	Disable
Options:	AIS | Yellow | Disable
Function:	Specifies the type of alarm signal to be generated while in BERT mode. Select Disable to disable the generation of alarm messages. Select AIS (Alarm Indication Signal) to transmit Blue alarms (all 1s). Select Yellow to transmit Yellow alarms (all 0s).
Instructions:	Select an alarm generation option and click on Apply.
MIB Object ID:	1.3.6.1.4.1.18.3.4.8.2.1.22

Parameter:	**BERT Test Pattern**
Default:	Ones
Options:	Zeros | Ones | QRSS | 2e15 | 2e15 INV | 2e20 | 2e23 | 2e23 INV
Function:	Specifies the bit pattern transmitted during BERT diagnostics. When a port is in BERT mode, it can generate patterns such as all 1s, all 0s, or a QRSS (quasi-random signal sequence) pattern.
Instructions:	Select a test pattern and click on Apply.
MIB Object ID:	1.3.6.1.4.1.18.3.4.8.2.1.21

Parameter:	**International Bit**
Default:	Disable
Options:	Enable | Disable
Function:	Specifies whether the international bit should be set in the E1 frame.
Instructions:	Select Enable to set the international bit, or select Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.3.1.16

Parameter:	**Line Coding**
Default:	HDB3
Options:	AMI | HDB3
Function:	Selects a line coding method. Alternate Mask Inversion (AMI) line coding is bipolar: a binary 0 is transmitted as zero volts and a binary 1 is transmitted as either a positive or negative pulse, opposite in polarity to the previous pulse. (When configured for AMI line coding, the MCE1 link module remains in synchronization upon receiving up to 45 consecutive 0s.) HDB3 (High-Density Bipolar Coding) line coding replaces a block of eight consecutive binary 0s with an 8-bit HDB3 code containing bipolar violations in the fourth and seventh bit positions of the substituted code. In the receive direction, the HDB3 code is detected and replaced with eight consecutive binary 0s.
Instructions:	Specify the line coding method.
MIB Object ID:	1.3.6.1.4.1.18.3.4.8.2.1.10

Parameter:	**Line Type**
Default:	None
Options:	E1 | E1 CRC | E1 MF | E1 CRC MF
Function:	Specifies the frame format.
Instructions:	Select the appropriate frame format for the E1 equipment. Note that the router does not support MF framing when you enable BERT mode.
MIB Object ID:	1.3.6.1.4.1.18.3.4.8.2.1.9

Running the Tests

When you have set the test parameters, you can test the line.

To test the MCE1 line:

1. **Start at the MCE1 Port Actions window (refer to Figure 5-21).**
2. **Click on the appropriate Send Command.**

   Refer to Table 5-1 for a list of the commands and their functions.
3. **Click on Apply.**

Caution: *Wait until the MCE1 Port Actions window updates before selecting another action.*

4. **Repeat Steps 2 and 3 for each test you want to run.**
5. **Click on Done.**

   The MCE1 Port Parameters window appears (refer to Figure 5-20). All changes you apply to the port in the MCE1 Port Actions window are effective only while the window is active. When you exit the MCE1 Port Actions window, all port settings revert to the original port settings.

Table 5-1. Send Commands for BERT Mode

Send Command	Function
Reset BERT Counters	Resets all counters to 0
Insert 1 Error	Inserts a single (non-repeating) error into the bit stream
Insert 1 Error/1K	Inserts a deliberate error into every thousandth position in the bit stream
Insert 1 Error/1M	Inserts a deliberate error into every millionth position in the bit stream
Disable Insert Error	Stops the insertion of deliberate errors into the bit stream

Chapter 6
Configuring MCT1

This chapter describes how to use the Configuration Manager to add single-line and multiline MCT1 circuits to a Bay Networks router that contains a Multichannel T1 link module.

The last section of this chapter explains how to initiate MCT1 line tests in dynamic mode.

Note: *Unless specifically stated, all procedures that apply to MCT1 modules also apply to QMCT1 modules.*

For each MCT1 parameter, this chapter provides information about default settings, valid parameter options, the parameter function, instructions for setting the parameter, and the MIB object ID.

The Technician Interface allows you to modify parameters by issuing **set** and **commit** commands with the MIB object ID. This process is equivalent to modifying parameters using Site Manager. For more information about using the Technician Interface to access the MIB, refer to *Using Technician Interface Software.*

Caution: *The Technician Interface does not verify that the value you enter for a parameter is valid. Entering an invalid value can corrupt your configuration.*

Adding MCT1 Circuits

Before you add MCT1 circuits, access the Configuration Manager window (Figure 6-1). See *Configuring Routers* for more information on the Configuration Manager window and connectors.

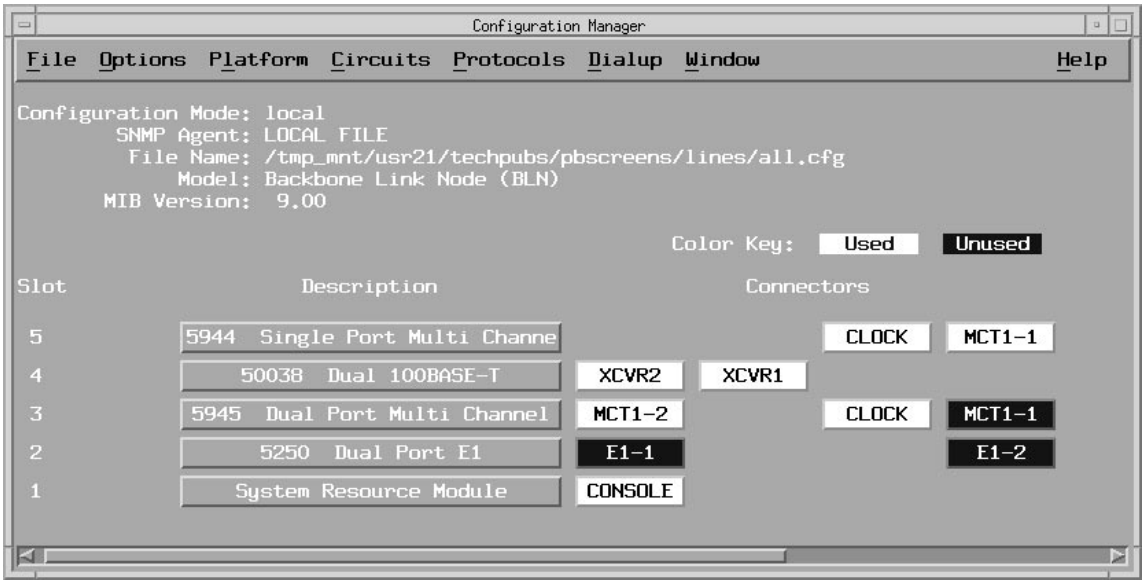
Configuration Manager
File Options Platform Circuits Protocols Dialup Window Help
Configuration Mode: local
SNMP Agent: LOCAL FILE
File Name: /tmp_mnt/usr21/techpubs/pbscreens/lines/all.cfg
Model: Backbone Link Node (BLN)
MIB Version: 9.00
Color Key: Used Unused
Slot
Description
Connectors
5 5944 Single Port Multi Channe CLOCK MCT1-1
4 50038 Dual 100BASE-T XCVR2 XCVR1
3 5945 Dual Port Multi Channel MCT1-2 CLOCK MCT1-1
2 5250 Dual Port E1 E1-1 E1-2
1 System Resource Module CONSOLE

Figure 6-1. Configuration Manager Window with MCT1 in Slot 3

To add MCT1 circuits, you must

- Set clock parameters.
- Choose the port application.
- Configure the port.

If you are using an MCT1 link module other than a QMCT1 module, you set clock parameters before you choose the port application. If you are using a QMCT module, you choose the port application before you set the clock parameters.

Setting Clock Parameters for MCT1 Lines Other Than QMCT1 Lines

All MCT1 link modules other than QMCT1 modules contain one clock chip that provides the timing signals for all ports. The clock parameters you set for the first port apply to all subsequent ports on the link module.

To set clock parameters:

1. **Start at the Configuration Manager window (refer to Figure 6-1).**
2. **Click on the CLOCK connector for the MCT1 module.**

   The Edit Slot DS1/E1 Clock Parameters window appears (Figure 6-2).

Note: *The titles of MCT1 windows indicate the slot number of the MCT1 link module.*

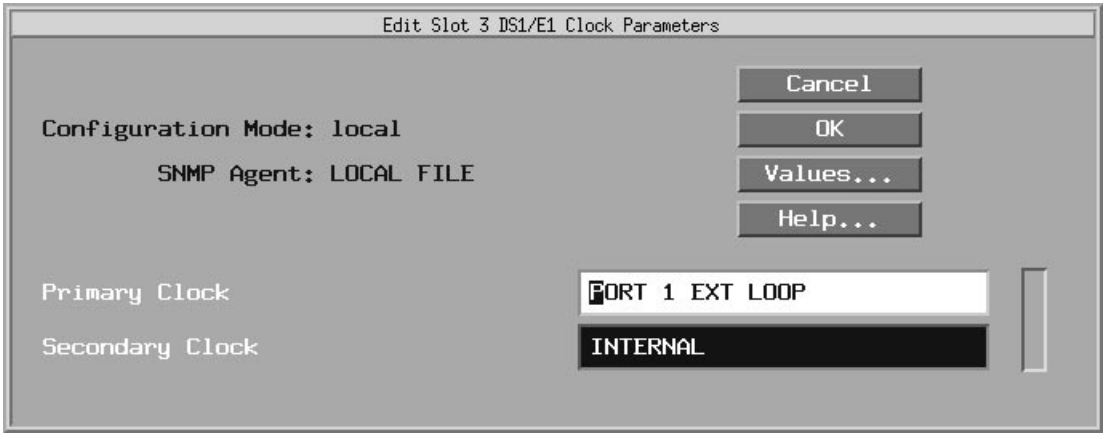

Figure 6-2. Edit Slot DS1/E1 Clock Parameters Window

The clock parameters define the timing sources that apply globally to all ports and DS0 timeslots the MCT1 link module supports.

3. **Select new values for the clock parameters that you want to edit.**

   Use the descriptions that follow for guidelines.

4. **Click on OK.**

Parameter: **Primary Clock**

Default: Port 1 Ext Loop

Options: Internal | Port 1 Ext Loop | Port 2 Ext Loop | Auxiliary Ext

Function: Identifies the primary source of the timing signals, as follows:

Internal	Uses the clock chip on the link module
Port 1 Ext Loop	Uses the signal coming in from Port 1
Port 2 Ext Loop	Uses the signal coming in from Port 2
Auxiliary Ext	Uses an external source via the DB9 interface

Instructions: Specify the source of the primary transmit clock.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.1.1.4

Parameter: **Secondary Clock**

Default: Internal

Options: Internal | Port 1 Ext Loop | Port 2 Ext Loop | Auxiliary Ext

Function: Identifies the secondary source of the timing signals, as follows:

Internal	Uses the clock chip on the link module
Port 1 Ext Loop	Uses the signal coming in from Port 1
Port 2 Ext Loop	Uses the signal coming in from Port 2
Auxiliary Ext	Uses an external source via the DB9 interface

The router uses the secondary clock only when the primary clock becomes unavailable.

Instructions: Specify the source of the secondary transmit clock.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.1.1.5

Selecting the Port Application

To select the port application:

1. **Start at the Configuration Manager window (refer to Figure 6-1).**
2. **Click on an MCT1 connector.**

   The Port Application window appears (Figure 6-3).

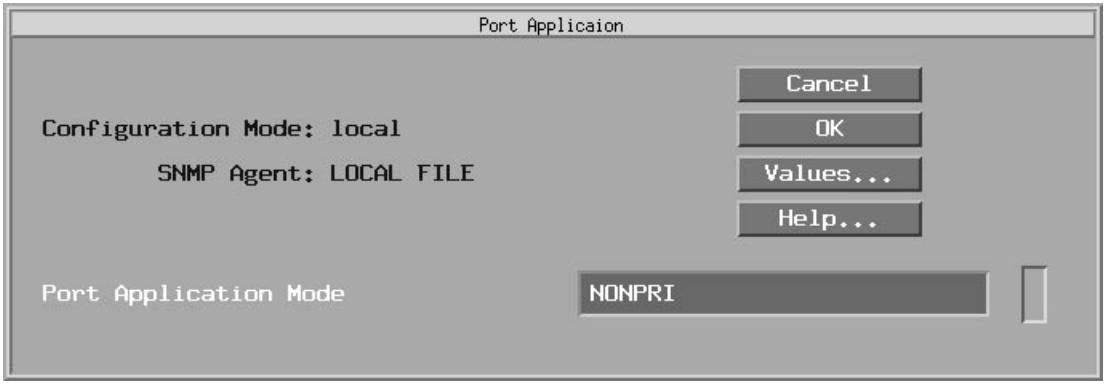

Figure 6-3. Port Application Window

3. **Edit the Port Application Mode parameter.**

   Use the description that follows as a guideline.
4. **Click on OK.**

   - If you are using an MCT1 module other than a QMCT1 module, the MCT1 Port Parameters window appears (Figure 6-4). Go to "Setting MCT1 Port Parameters," later in this chapter.
   - If you are using a QMCT1 module, the DS1/E1 Clock Parameters window appears (refer to Figure 6-2). Go to "Setting Clock Parameters for QMCT1 Lines," later in this chapter.

Parameter: **Port Application Mode**

Default: NONPRI

Options: NONPRI | PRI

Function: Specifies the application that the logical lines of this port provide, as follows:

NONPRI	Indicates that all the lines have a permanent circuit number and are for leased lines, Frame Relay, or permanent connections for other non-ISDN PRI applications
PRI	Indicates that the lines are for switched circuits using ISDN

Instructions: Select NONPRI or PRI.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.3.1.16

Setting Clock Parameters for QMCT1 Lines

When you are configuring a QMCT1 line, and click on OK in the Port Application window (refer to Figure 6-3)the DS1/E1 Clock Parameters window appears (refer to Figure 6-2).

To set the clock parameters:

1. **Select new values for the clock parameters that you want to edit.**

   Refer to the descriptions following this procedure for guidelines.

2. **Click on OK.**

   The MCT1 Port Parameters window appears (Figure 6-4).

Parameter: **Primary Clock**

Default: Internal

Options: Internal | Port 1 Ext Loop | Port 2 Ext Loop | Port 3 Ext Loop | Port 4 Ext Loop | Auxiliary Ext

Function: Identifies the primary source of the timing signals for QMCT1 link modules, as follows:

.

Internal	Uses the clock chip on the link module
Port *n* Ext Loop	Uses the signal coming in from Port *n*
Auxiliary Ext	Uses an external source via the DB9 interface

You can edit this parameter only for a QMCT1 link module.

Instructions: Specify the source of the primary transmit clock.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.18.1.3

Parameter: **Secondary Clock**

Default: Internal

Options: Internal | Port 1 Ext Loop | Port 2 Ext Loop | Port 3 Ext Loop | Port 4 Ext Loop | Auxiliary Ext

Function: Identifies the secondary source of the timing signals for QMCT1 link modules, as follows:

.

Internal	Uses the clock chip on the link module
Port *n* Ext Loop	Uses the signal coming in from Port *n*
Auxiliary Ext	Uses an external source via the DB9 interface

The router uses the secondary clock only when the primary clock becomes unavailable.

You can edit this parameter only for a QMCT1 link module.

Instructions: Specify the source of the secondary transmit clock.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.18.1.4

Editing the Clock Parameters for QMCT1

You can edit the clock parameters for QMCT1 lines in the MCT1 Port Parameters window any time after initial configuration.

To edit the clock parameters for QMCT1:

1. **Start at the Configuration Manager window (refer to Figure 6-1).**
2. **Click on an MCT1 connector.**

   The MCT1 Port Parameters window appears (Figure 6-4).
3. **Scroll through the list of parameters.**
4. **Edit the clock parameters.**
5. **Click on OK.**

Setting MCT1 Port Parameters

The port parameters apply to each of the 24DS0 channels (timeslots) that an individual MCT1 port (connector) provides.

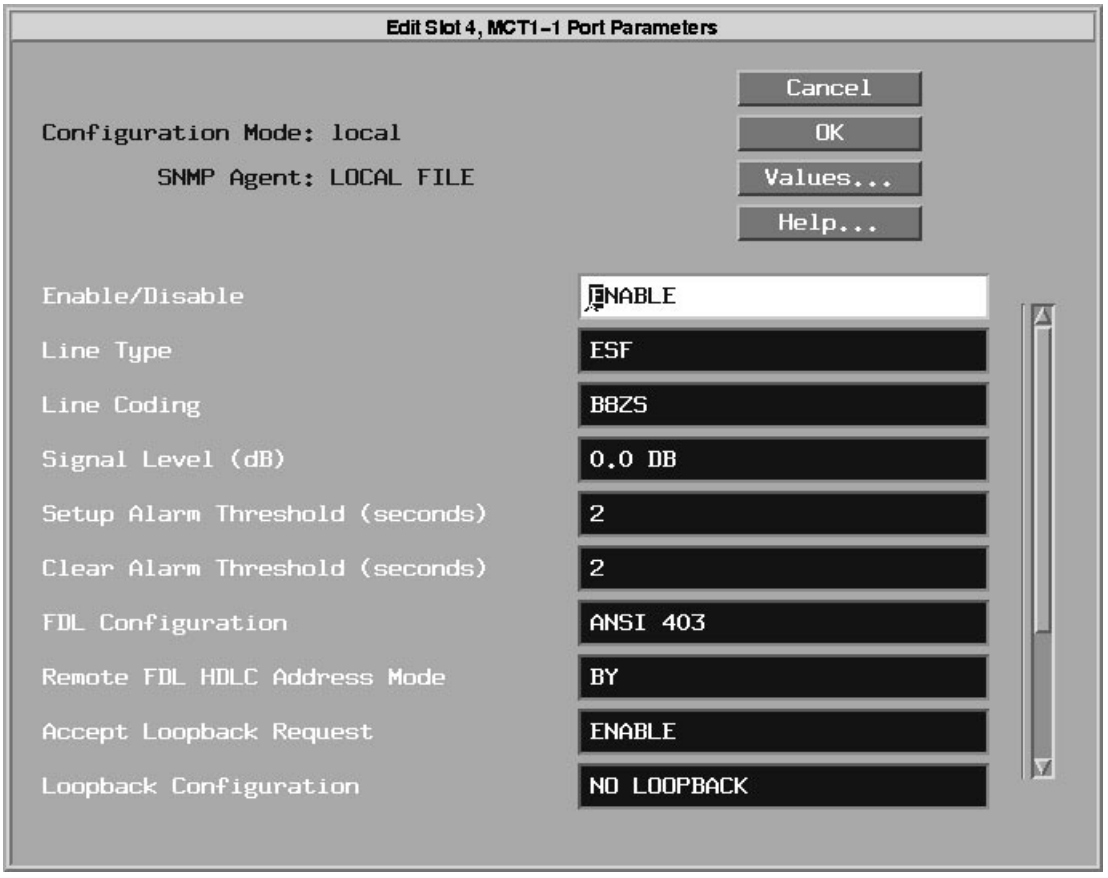

Figure 6-4. MCT1 Port Parameters Window

To edit MCT1 port parameters:

1. **Select new values for the port parameters that you want to edit.**
   Refer to the descriptions following this procedure for guidelines.
2. **Click on OK.**

Parameter: **Enable/Disable**

Default: Enable

Options: Enable │ Disable

Function: Enables or disables the MCT1 port.

Instructions: Set to Disable only if you want to disable the MCT1 port.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.3.1.2

Parameter: **Line Type**

Default: ESF

Options: Unframed T1 │ ESF │ SF/D4

Function: Selects either ESF or SF/D4 framing format.

Unframed T1	Use only with BERT mode to match the line type
ESF	Transmits superframes consisting of 24 individual SF/D4 frames and provides enhanced signaling and synchronization
SF/D4	Transmits superframes consisting of 12 individual frames

Instructions: Select the appropriate frame format for your T1 equipment.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.4.1.6

Parameter: **Line Coding**

Default: B8ZS

Options: AMI | B8ZS

Function: Selects a line coding method. AMI line coding is bipolar: a binary 0 is transmitted as zero volts and a binary 1 is transmitted as either a positive or negative pulse, opposite in polarity to the previous pulse. (When configured for AMI line coding, the MCT1 link module remains synchronized upon receiving up to 45 consecutive 0s.)

B8ZS (Bipolar with 8-Zero substitution) line coding replaces a block of eight consecutive binary 0s with an 8-bit B8ZS code containing bipolar violations in the fourth and seventh bit positions of the substituted code. In the receive direction, the B8ZS code is detected and replaced with eight consecutive binary 0s.

Instructions: Specify the line coding method.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.4.1.7

Parameter: **Signal Level (dB)**

Default: 0.0 dB

Options: -15 dB | -7.5 dB | 0.0 dB | 0.5 dB | 0.8 dB | 1.1 dB | 1.5 dB

Function: Specifies the T1 transmit power level in decibels (dB).

The DS1 values of -15 and -7.5 dB are long-haul and the carrier determines these values if 0.0 dB is not sufficient.

The DSX1 values of 0.0, 0.5, 0.8, 1.1, and 1.5 dB are short-haul and correlate with cable length as follows:

0.0 dB	0 to 133 ft
0.5 dB	133 to 266 ft
0.8 dB	266 to 399 ft
1.1 dB	399 to 533 ft
1.5 dB	533 to 655 ft

Instructions: Specify the decibel level according to the length of the cable or as the carrier specifies.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.3.1.6

Parameter:	**Setup Alarm Threshold (seconds)**
Default:	2 seconds
Range:	2 to 10 seconds
Function:	Specifies the time interval during which MCT1 tolerates a performance defect or anomaly. If the performance defect or anomaly is still present when this time interval expires, MCT1 records a performance failure and logs an event message.
Instructions:	Set the timer value.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.3.1.7

Parameter:	**Clear Alarm Threshold (seconds)**
Default:	2 seconds
Range:	2 to 10 seconds
Function:	Specifies the clear time for performance failure conditions. If the defect or anomaly clears within this time interval, MCT1 records a performance-cleared condition and logs an event message.
Instructions:	Set the timer value.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.3.1.8

Parameter:	**FDL Configuration**
Default:	ANSI 403
Options:	ANSI 403 | AT&T 54016 | None
Function:	Selects a Facility Data Link (FDL) mode only when the line is configured with an ESF line type. The default, ANSI 403 mode, conforms to the 1989 ANSI T1.403 specification (*Carrier-to-Customer Installation DS1 Metallic Interface*); AT&T 54016 conforms to the 1989 AT&T specification (*Requirements for Interfacing Digital Terminal Equipment to Services Employing the Extended Superframe Format*).
Instructions:	Specify the operational mode.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.4.1.14

Parameter: **Remote FDL HDLC Address Mode**

Default: BY

Options: AZ | BY

Function: Selects the FDL address mode to determine whether the near-end FDL responds to HDLC address BY or AZ in messages from the far-end FDL.

Instructions: Specify the address mode.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.3.1.9

Parameter: **Accept Loopback Request**

Default: Enable

Options: Enable | Disable

Function: Enables or disables loop-up and loop-down code detection circuitry in the link module. When this parameter is enabled, this interface accepts and complies with requests to go into loopback mode from a far-end device.

Instructions: Enable or disable local loopback.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.3.1.10

Parameter: **Loopback Configuration**

Default: No Loopback

Options: No Loopback | Payload Loopback | Line Loopback

Function: Setting this parameter forces the DS1 interface into loopback. The far-end or intermediate equipment then performs diagnostics on the network between that equipment and the DS1 interface. After testing, set this parameter to No Loopback to return the interface to normal operation.

Payload Loopback	The received signal at this interface is looped through the device. Typically the received signal is looped back for retransmission after it has passed through the device's framing function.
Line Loopback	The received signal does not go through the framing device (minimum penetration) but is looped back out.

Instructions: Select the loopback configuration option.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.4.1.10

Parameter:	**Send Performance Measurement CR Addr**
Default:	prmCi
Options:	prmCi | prmCarrier
Function:	Specifies the source of performance messages; prmCi indicates that the customer installation supplies the messages, and prmCarrier indicates that the carrier supplies the messages. You can configure this parameter only for QMCT1 link modules.
Instructions:	Select prmCi or prmCarrier.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.3.1.18

Parameter:	**Accept Perf Measurement CR Addr**
Default:	prmCi
Options:	prmCi | prmCarrier
Function:	Specifies the source from which the router accepts performance messages; prmCi indicates that the router accepts messages only from the customer installation, and prmCarrier indicates that the router accepts messages only from the carrier. You can configure this parameter only for QMCT1 link modules.
Instructions:	Select prmCi or prmCarrier.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.3.1.19

Configuring Non-PRI Circuits

After you set port parameters for a non-PRI circuit and click on OK in the MCT1 Port Parameters window (refer to Figure 6-4), the MCT1 Logical Lines window appears (Figure 6-5). Logical lines are the logical paths for data communications on a physical connection.

To add MCT1 logical lines:

- Add a circuit for each logical line.
- Define logical lines.
- Group lines into a multiline circuit (optional).
- Complete the logical line parameters.
- Assign timeslots.
- Save your changes.

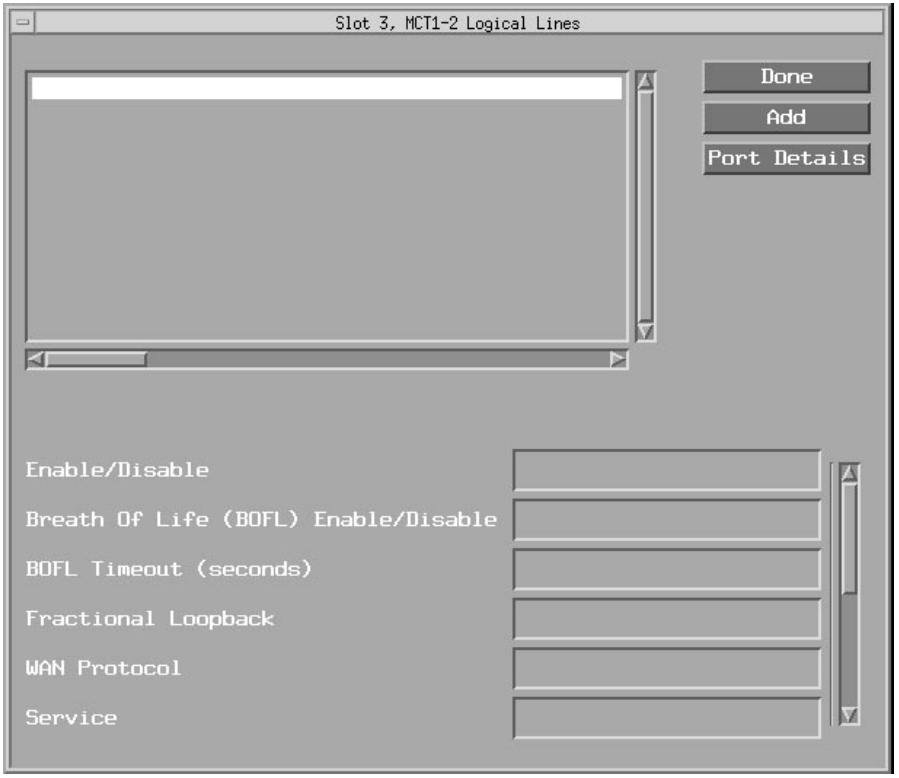

Figure 6-5. MCT1 Logical Lines Window before Defining a Circuit

Adding Circuits for and Defining Logical Lines

To add a circuit for each logical line and define logical lines:

1. **Start at the MCT1 Logical Lines Window (refer to Figure 6-5).**
2. **Click on Add.**

   The Add Circuit window appears (Figure 6-6).

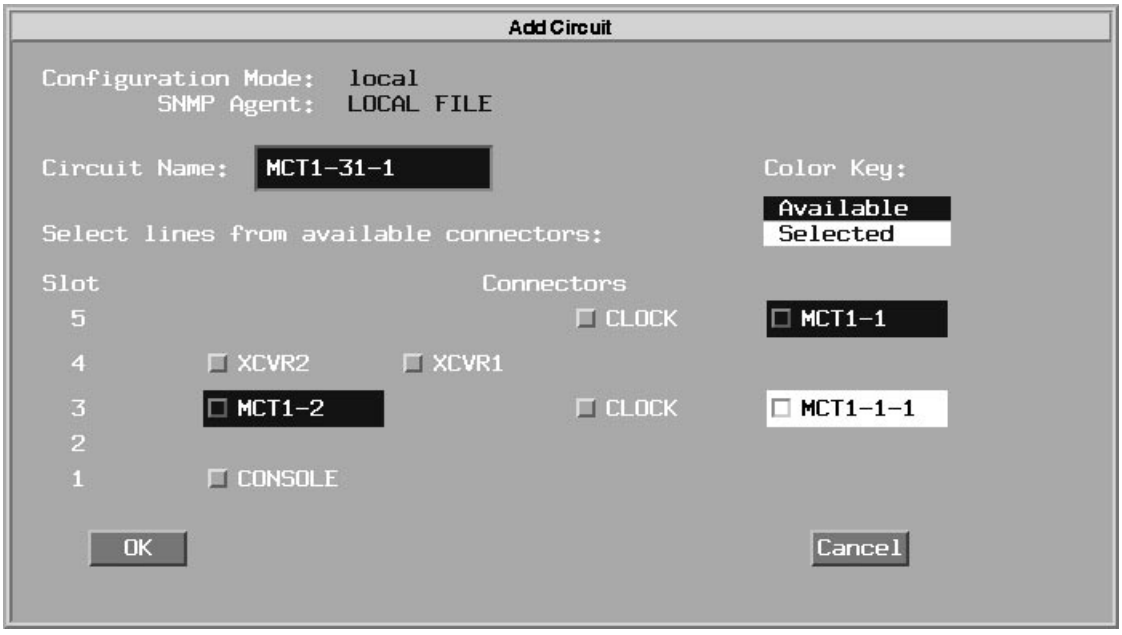

Figure 6-6. Add Circuit Window

3. **Name the logical line's circuit.**

   You can use the default circuit name that appears in the Add Circuit window, or change the name by clicking on the Circuit Name box and typing in a new name.

   Figure 6-7 illustrates how Site Manager generates the default circuit name. The default name identifies the circuit type (MCT1), the physical connector (slot and port number), and the number of the logical line on the MCT1 port associated with the circuit.

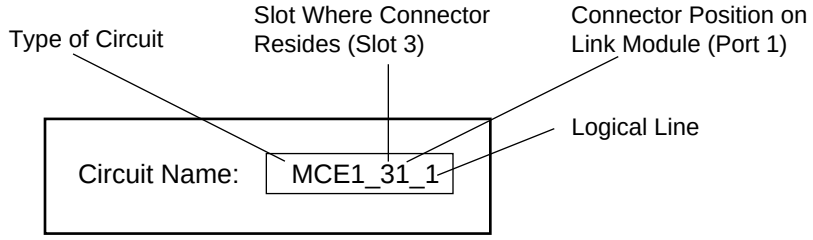

Figure 6-7. MCT1 Default Circuit Name

4. **Click on OK.**

   The WAN Protocols window appears. Refer to *Configuring Routers* and the appropriate protocol configuration guide for information about selecting WAN protocols.

5. **Select the WAN protocol and click on OK.**

   The Select Protocols window appears.

6. **Select the protocols to run on this logical line.**

   Refer to *Configuring Routers* and the appropriate protocol configuration guide for instructions. When you have finished, the MCT1 Logical Lines window appears, showing the first MCT1 circuit (Figure 6-8).

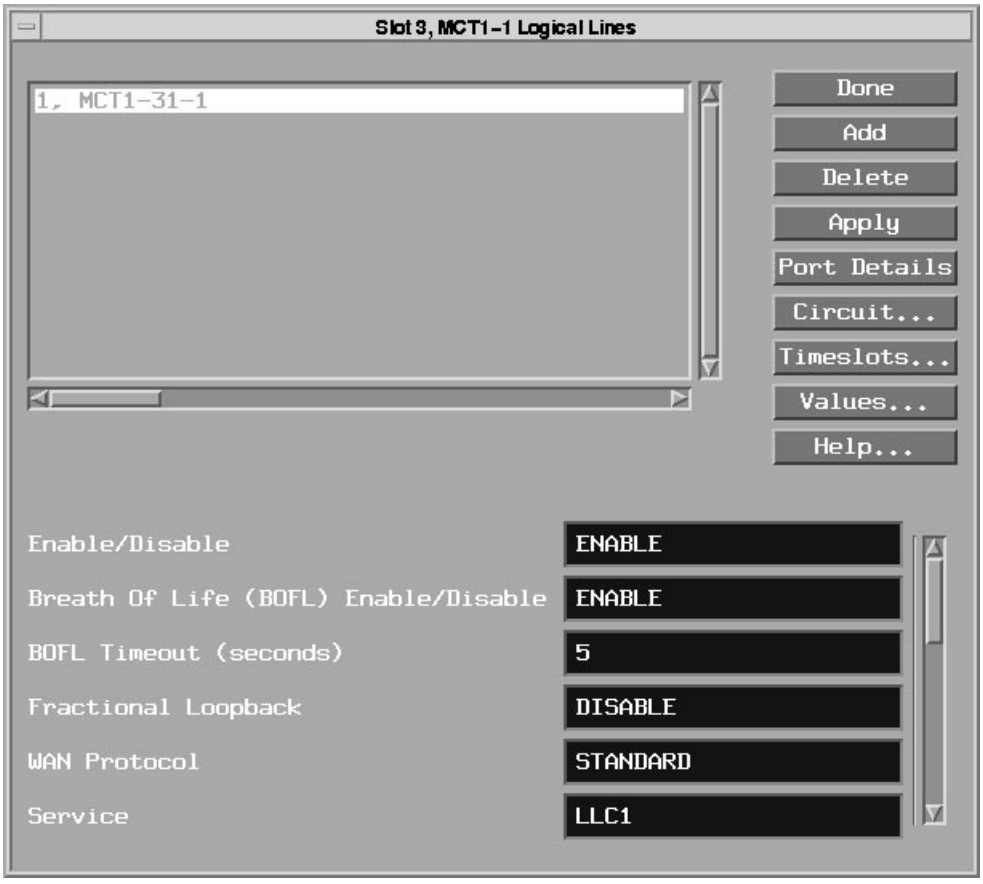

Figure 6-8. MCT1 Logical Lines Window with One Circuit Defined

7. **Repeat Steps 2 through 6 for each circuit that you want to create.**

   A single MCT1 port supports up to 24 logical lines. Each logical line supports one circuit.

Grouping Lines into a Multiline Circuit

This section describes how to group multiple unused MCT1 logical lines into one multiline circuit. An unused logical line is one without a defined circuit. You can group as many as 24 logical lines into one multiline circuit. All logical lines in a multiline group have the same circuit name. See Chapter 7 for detailed information about multiline services.

Note: *If you do not want to group the MCT1 logical lines into a multiline circuit, go to "Configuring the Logical Line," later in this chapter.*

Before you can group the lines, you must create the unused lines. To create unused lines:

1. **Start at the MCT1 Logical Lines window (refer to Figure 6-8).**
2. **Click on Add.**

   The Add Circuit window appears (refer to Figure 6-6).
3. **Click on Cancel.**

   Clicking on OK adds a circuit for this line. Clicking on Cancel creates an unused logical line. The unused logical line will be the next available logical line, represented by a number between 1 and 24.

   The MCT1 Logical Lines window reappears (Figure 6-9).
4. **Repeat Steps 2 and 3 for each unused logical line that you want to create.**

   The MCT1 Logical Lines window now lists the unused logical lines. Figure 6-9 shows three unused logical lines.

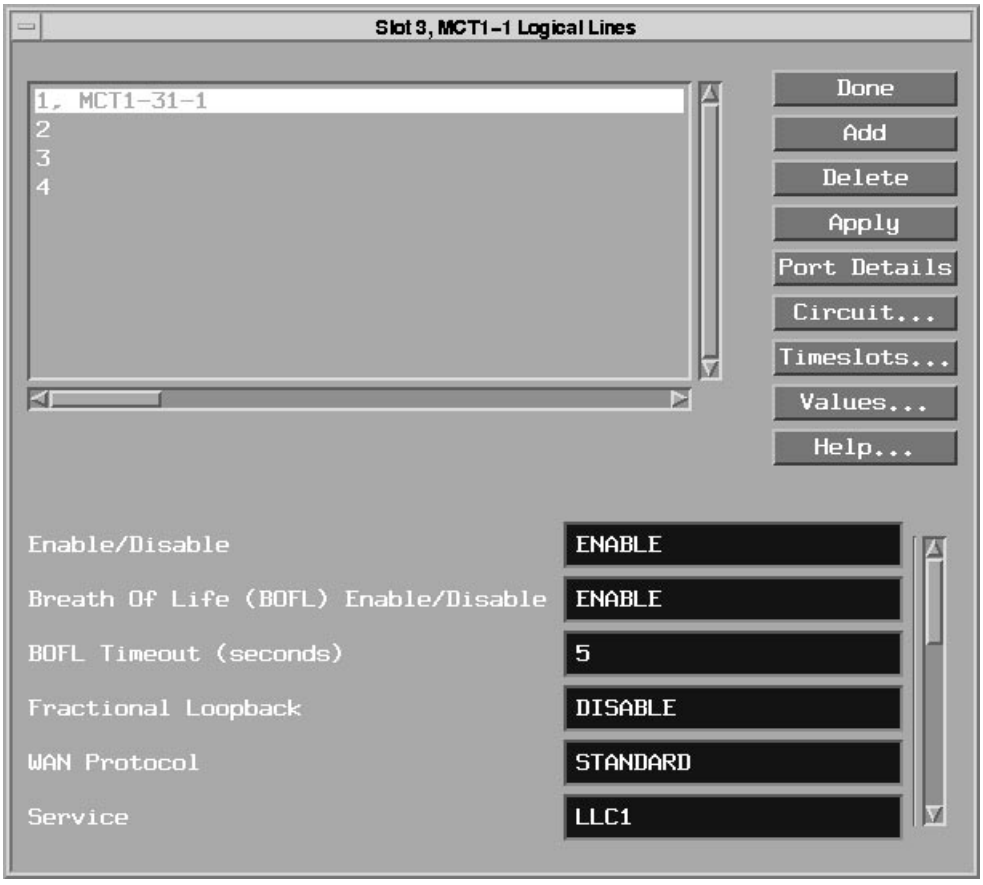

Figure 6-9. MCT1 Logical Lines Window with Unused Logical Lines

To group lines into a multiline group:

1. **Highlight the circuit that you want to include in a multiline group.**

   Figure 6-9 shows Logical Line 1 with circuit name MCT1-31-1 highlighted.

2. **Click on Circuit.**

   The Circuit Definition window appears (Figure 6-10).

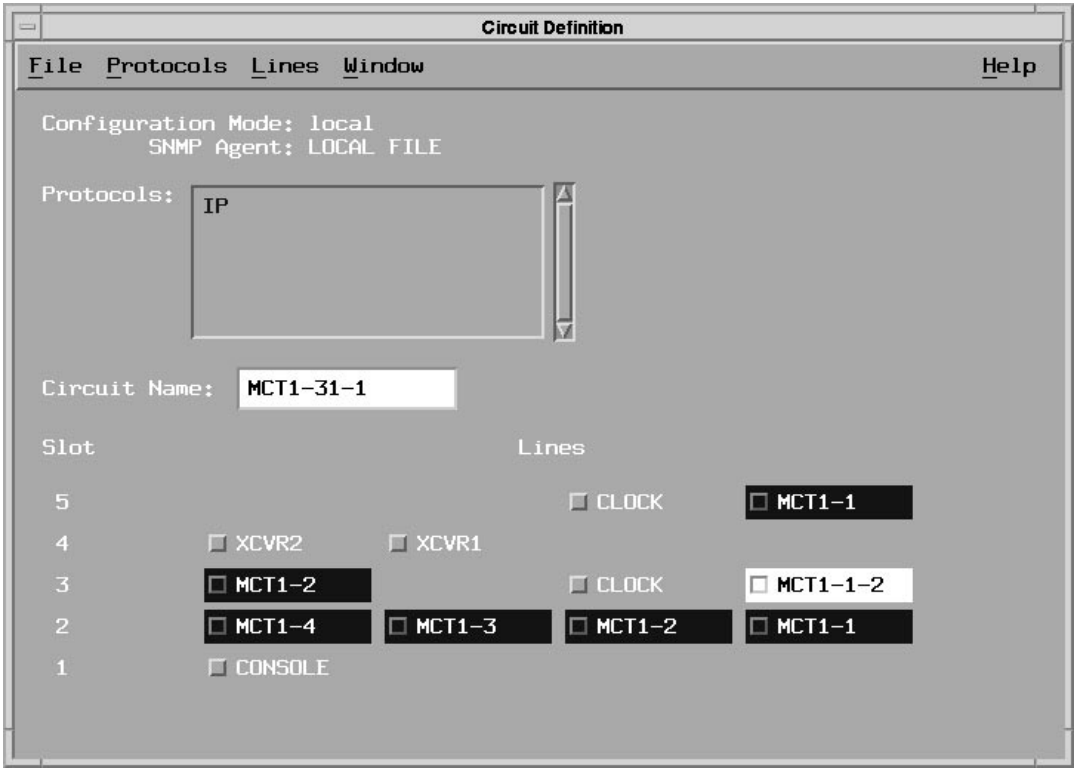

Figure 6-10. Circuit Definition Window

3. **Click on the connector that has the unused logical lines.**

   The Select Logical Line window appears (Figure 6-11), displaying the lowest-numbered unused logical line.

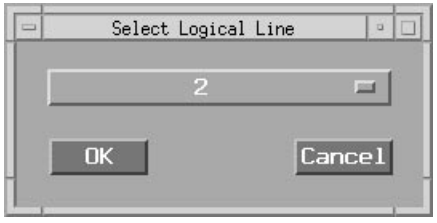

Figure 6-11. Select Logical Line Window

4. **Click on and hold down the logical line number (Figure 6-12).**

   The Select Logical Lines window displays any additional unused logical lines.

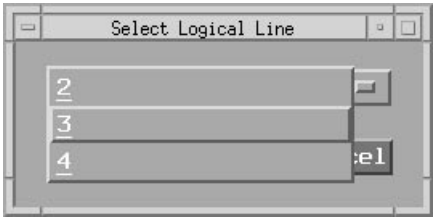

Figure 6-12. Selecting an Unused Logical Line

5. **Select a logical line you want to include in the multiline circuit.**
6. **Click on OK.**

   The Circuit Definition window appears.

7. **Select Lines→Change Lines.**
8. **Select Lines→Change Lines again to see if the Multiline option is now available for this circuit (Figure 6-13).**

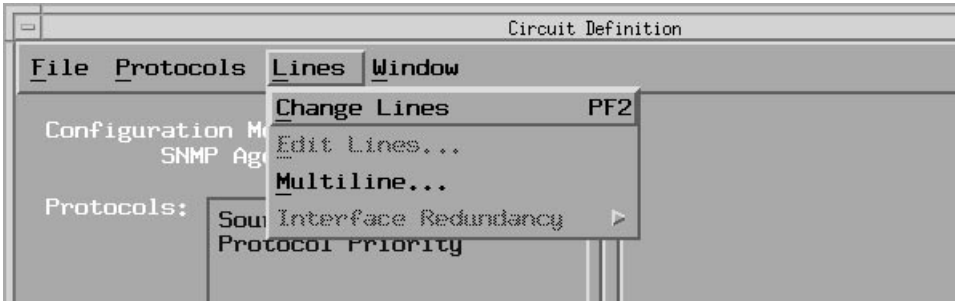

Figure 6-13. Selecting Change Lines from the Circuit Definition Window

9. **Repeat Steps 3 through 7 for each unused logical line that you want to include in the multiline circuit.**

   These logical lines are now grouped as a circuit.

10. **Select File→Exit.**

    The MCT1 Logical Lines window returns, displaying a multiline group (Figure 6-14). Notice that all logical lines now have the same circuit name, MCT1-31-1.

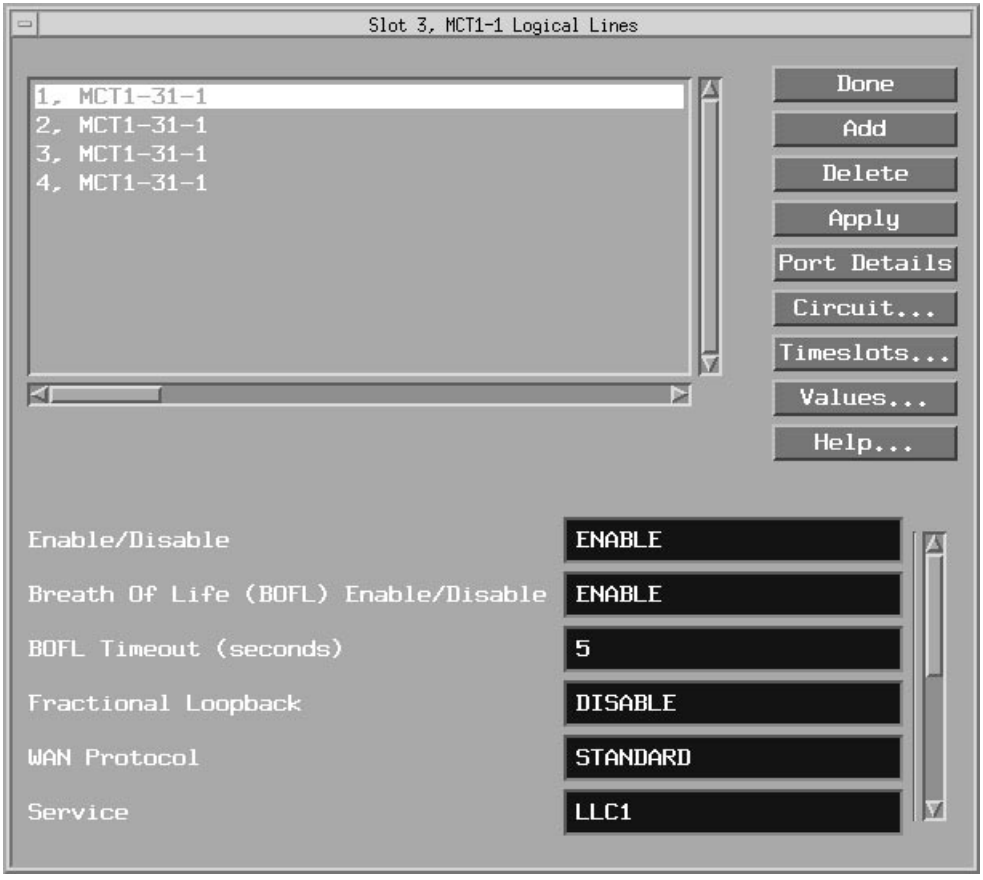

Figure 6-14. MCT1 Logical Lines Window with a Multiline Circuit Defined

Configuring the Logical Line

After you finish adding a non-PRI circuit to a logical line, the MCT1 Logical Lines window (refer to Figure 6-14) displays a configured circuit name next to each logical line. This window also displays the parameter values for the highlighted logical line.

Use the scroll bar in the MCT1 Logical Lines window to view additional logical line parameters.

To edit parameters for a logical line:

1. **Select the line and circuit name from the logical line list.**

   Site Manager displays the circuit's parameters.

2. **Edit the parameters you want to change.**

   Refer to the following descriptions for guidelines.

3. **Click on Apply.**

Parameter:	**Enable/Disable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables the logical line.
Instructions:	Select Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.2

Parameter:	**Breath of Life (BOFL) Enable/Disable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables the transmission of BOFL packets. When you set this parameter to Enable, a BOFL packet is sent out on the wire as often as the value you specify for the BOFL Timeout parameter.
Instructions:	Select Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.8

Parameter:	**BOFL Timeout (seconds)**
Default:	5 seconds
Range:	1 to 60 seconds
Function:	Indicates the time period between Breath of Life packets.
Instructions:	Set the time between BOFL packets in seconds.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.9

Parameter:	**Fractional Loopback**
Default:	Disable
Options:	Enable | Disable
Function:	Specifies whether or not to use diagnostic loopback mode on this circuit. In this mode, the router retransmits received data to the sender.
Instructions:	Select Enable only if you want the port in loopback mode.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.10

Parameter:	**WAN Protocol**
Default:	Standard
Options:	Standard | PPP | SMDS | Frame Relay
Function:	Specifies the WAN protocol you configured for this logical line.
Instructions:	Accept the current value.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.14

Parameter: **Service**

Default: LLC1

Options: Transparent | LLC1

Function: Sets the HDLC service type for this line. Transparent is basic HDLC mode. LLC1 adds the HDLC address and control fields as a prefix to the frame.

Instructions: Select the logical line HDLC service.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.15

Parameter: **Local HDLC Address**

Default: 7

Range: 1 to 255

Function: Specifies the 1-byte HDLC address of this MCT1 interface, as follows.

1	Address of the DCE
3	Address of the DTE
Any other value	An explicit address value

Instructions: Select an appropriate local HDLC address. Site Manager assumes that the values you enter are decimal. To enter a hexadecimal value, preface the value with 0x; for example, 0x10.

Use unique HDLC addresses for the local and remote interfaces at either end of the point-to-point circuit. If you configure a device at one end of a point-to-point connection with a local address of DCE and a remote address of DTE, you must configure the device at the other end with a local address of DTE and a remote address of DCE.

If you configure X.25 on this line, set this parameter to either 1 (DCE) or 3 (DTE).

When you send packets to this interface, use this HDLC address.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.16

Parameter: **Remote HDLC Address**

Default: 7

Range: 1 to 255

Function: Specifies the 1-byte HDLC address of the remote MCT1 interface, as follows:

1	Address of the DCE
3	Address of the DTE
Any other value	An explicit address value

Instructions: Select an appropriate remote HDLC address. Site Manager assumes that the values you enter are decimal. To enter a hexadecimal value, preface the value with 0x; for example, 0x10.

Use unique HDLC addresses for the local and remote interfaces at either end of the point-to-point circuit. If you configure a device at one end of a point-to-point connection with a local address of DCE and a remote address of DTE, you must configure the device at the other end with a local address of DTE and a remote address of DCE.

If you configure X.25 on this line, set this parameter to either 1 (DCE) or 3 (DTE).

When you send packets to this interface, use this HDLC address.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.17

Parameter: **Rate Adaptation**

Default: 56 K LSB

Options: 64 K │ 56 K MSB │ 56 K LSB

Function: Determines the number of bits and their bit positions within the timeslot. The 64 K selection uses all 8 bits in the timeslot. The two 56 K selections use 7 of the 8 bits in the timeslot. The 56 K MSB selection does not use the most significant bit, and the 56 K LSB selection does not use the least significant bit in the timeslot.

Instructions: Select the line rate adaptation.

MIB Object ID: 1.3.6.1.4.1.18.3.4.9.6.1.18

Parameter:	**Interframe Time Fill Character**
Default:	Flags
Options:	Flags | Idles
Function:	Specifies the interframe time-fill pattern for transmission across this circuit. Flags selects an 0x7E pattern (0 1 1 1 1 1 1 0); Idles selects an 0xFF pattern (1 1 1 1 1 1 1 1).
Instructions:	Set the line interframe time-fill character.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.19

Parameter:	**CRC Size**
Default:	16 bit CRC
Options:	32 bit CRC | 16 bit CRC
Function:	Specifies the Cyclic Redundancy Check (CRC) type. With 16-bit CRC, the router appends a 16-bit CRC to the transmitted frames and performs a 16-bit CRC on received frames. With 32-bit CRC, the router appends a 32-bit CRC to transmitted frames and performs a 32-bit CRC on received frames.
Instructions:	Set the CRC size.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.20

Parameter:	**MTU Size (bytes)**
Default:	1600
Range:	3 to 4608 bytes
Function:	Specifies the transmit/receive buffer size (Maximum Transmission Unit) to configure the largest frame that the router can transmit or receive across this MCT1 port. The router discards frames larger than this value.
Instructions:	Enter a value in the range 3 to 4608 bytes.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.55

Parameter:	**Remote Loopback Detection**
Default:	Disable
Options:	Enable | Disable
Function:	Enables or disables detection of the driver's own BOFL packets, providing you set the Breath of Life (BOFL) Enable/Disable parameter to Enable. If you select Enable and put the line into loopback mode the downstream driver will bring down the interface when it detects its own BOFL packets.
Instructions:	Select Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.56

Parameter:	**BERT Mode**
Default:	Disable
Options:	Enable | Disable
Function:	Enables or disables BERT mode. You can only configure this parameter for QMCT1 link modules.
Instructions:	Select Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.62

Parameter:	**BERT Test Pattern**
Default:	Ones
Options:	Zeros | Ones | QRSS | 2e15 | 2e15 Inverted | 2e20 | 2e23 | 2e23 Inverted
Function:	Specifies the test pattern. You can only configure this parameter for QMCT1 link modules.
Instructions:	Select a test pattern.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.63

Parameter:	**Accept Fractional Loopback Code**
Default:	Enable
Options:	Enable | Disable
Function:	Specifies whether or not the logical line can accept fractional T1 loopback code. You can only configure this parameter for QMCT1 link modules.
Instructions:	Select Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.64

Parameter:	**Line Resources**
Instructions:	Use this parameter to access the Edit Line Resources window for lines you configured with the ST2 protocol. Refer to "Accessing LRM on an MCT1 Line" in Chapter 8.

Assigning Timeslots

After setting up the logical lines, you must assign timeslots (also called *channels* or *DS0s*) for each circuit. To assign timeslots:

1. **Start at the MCT1 Logical Lines window (refer to Figure 6-14).**
2. **Click on Timeslots.**

   The MCT1 Timeslots window appears (Figure 6-15). This window graphically represents the 24 timeslots.

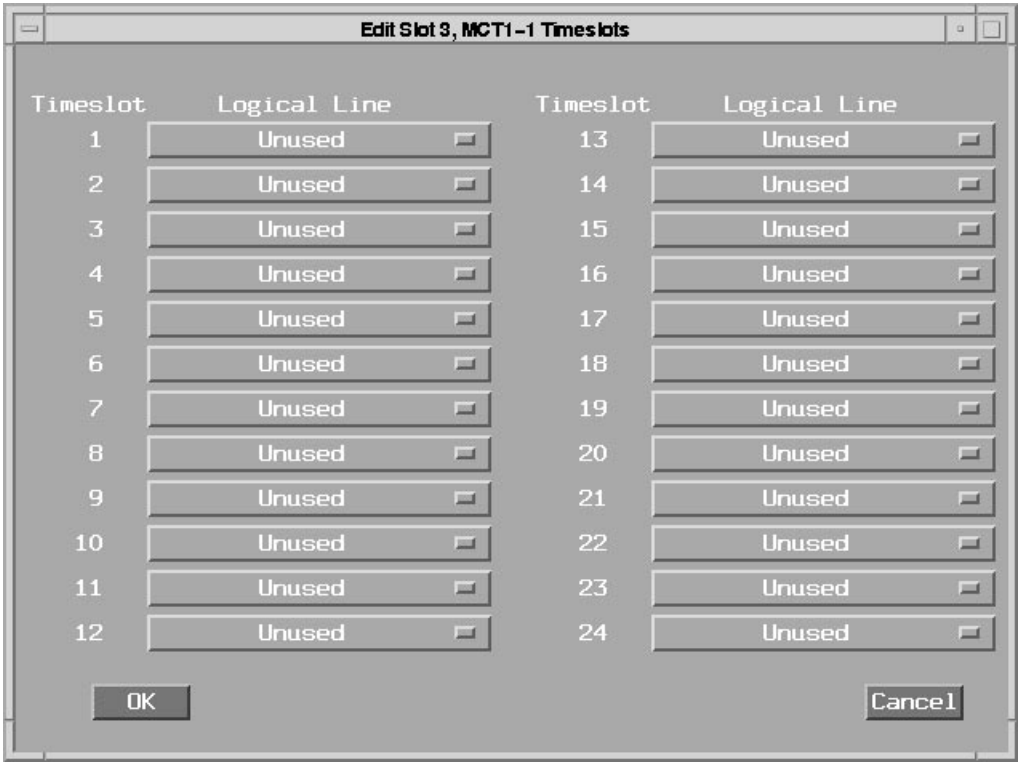

Figure 6-15. MCT1 Timeslots Window

3. **Click on a timeslot.**

   A list of possible circuits to which you can assign the timeslot appears (Figure 6-16).

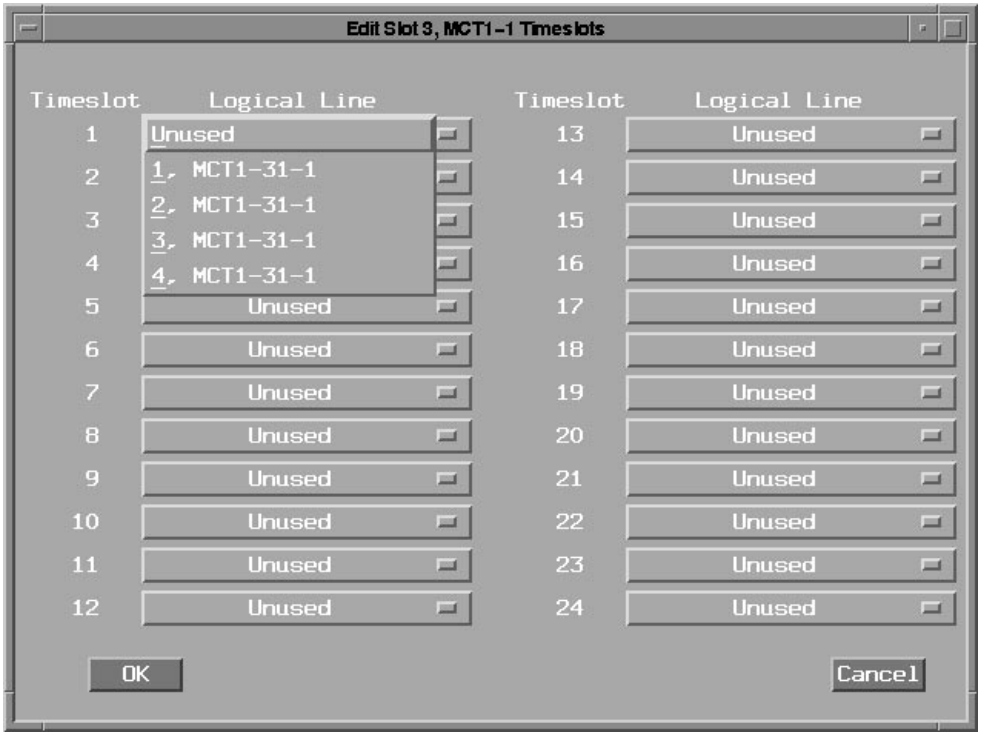

Figure 6-16. Assigning a Timeslot

4. **Select the circuit to which you want to assign the timeslot.**
5. **Repeat Steps 3 and 4 for each timeslot you want to assign.**
6. **Click on OK.**

   The MCT1 Logical Lines window appears (refer to Figure 6-14).

Saving Your Changes

To save the changes you have made to the MCT1 Logical Lines window (refer to Figure 6-14):

1. **Click on Apply.**
2. **Click on Done.**

   The Configuration Manager window appears (refer to Figure 6-1).

Configuring MCT1 ISDN PRI Circuits

After you set port parameters for a PRI circuit and click on OK in the MCT1 Port Parameters window (refer to Figure 6-4), the MCT1 PRI Logical Lines window appears (Figure 6-17). A few seconds later, the MCT1 Timeslots window appears (Figure 6-18).

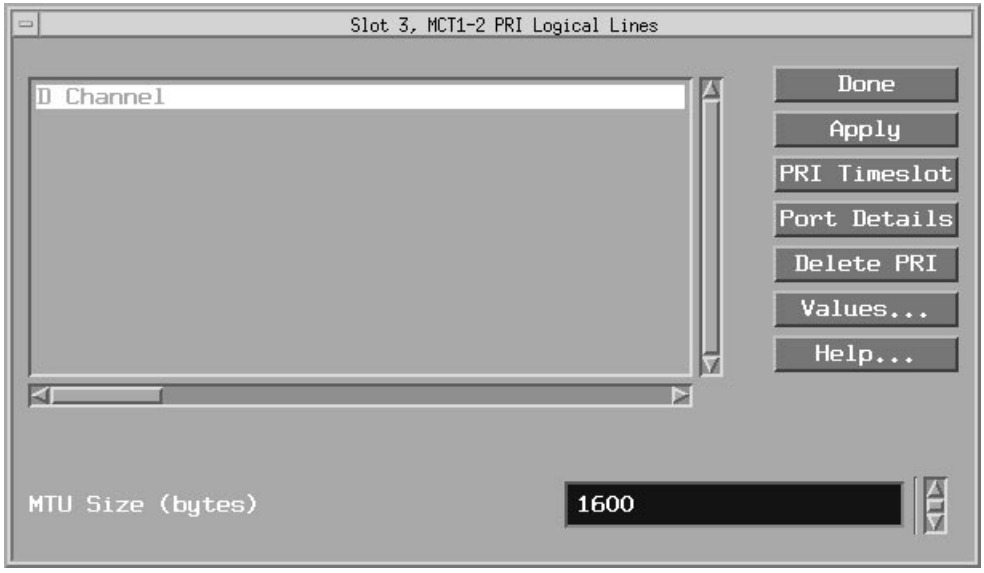

Figure 6-17. MCT1 PRI Logical Lines Window

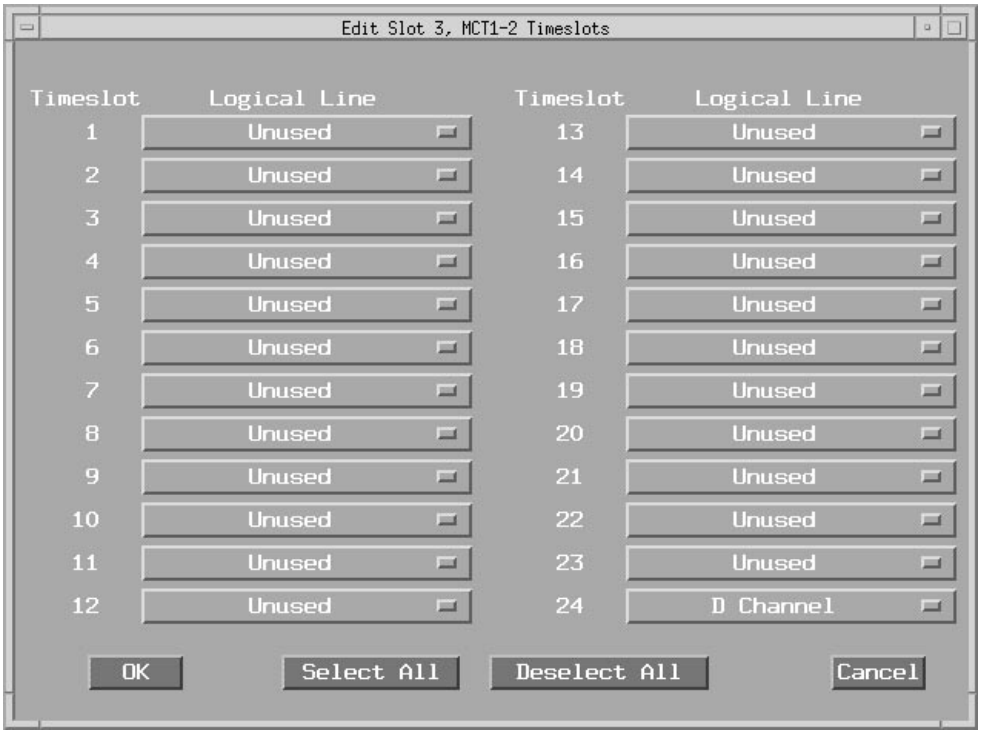

Figure 6-18. MCT1 Timeslots Window (ISDN PRI Configurations)

Follow the steps in this section to

- Assign timeslots.
- Edit the logical line parameter.
- Save your changes.

Assigning Timeslots

To assign the timeslots (also called *channels* or *DS0*s) for each circuit:

1. **Start at the MCT1 Timeslots window (refer to Figure 6-18).**

   The MCT1 Timeslots window graphically represents the 24 timeslots.

2. **Click on a timeslot.**

   Site Manager displays a list of circuits to which you can assign the timeslot.

3. **Select the circuit to which you want to assign the timeslot.**
4. **Repeat Steps 2 and 3 for each timeslot you want to assign.**
5. **Click on OK.**

   The MCT1 PRI Logical Lines window appears (refer to Figure 6-17).

Editing the B-Channel Logical Line Parameters

To modify the B-Channel line:

1. **Start at the MCT1 PRI Logical Lines window (refer to Figure 6-17).**
2. **Select the line and circuit name from the logical line list.**

   Site Manager displays the circuit's MTU.
3. **Edit the MTU Size (byte) parameter.**

   Use the parameter description that follows as a guideline.
4. **Click on Apply.**

Parameter:	**MTU Size (bytes)**
Default:	1600
Range:	3 to 4608 bytes
Function:	Specifies the transmit/receive buffer size (Maximum Transmission Unit) to configure the largest frame that the router can transmit or receive across this MCT1 port. The router discards frames larger than this value.
Instructions:	Enter a value in the range 3 to 4608 bytes.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.55

Saving Your Changes

To save the changes you have made to the MCT1 PRI Logical Lines window:

1. **Click on Apply.**
2. **Click on Done.**

   The Configuration Manager window appears (refer to Figure 6-1).

Testing MCT1 Lines

While in dynamic mode, you can use the Configuration Manager to trigger MCT1 port actions to test the quality of the line. MCT1 line tests include

- Transmitting specific codes to the remote end of the MCT1 connection
- Introducing deliberate error patterns into the transmitted BERT (Bit Error Rate Test) bit stream

All actions are MCT1 port-specific. For example, a send loopback action is transmitted across a specific port; a BERT reset action resets the port-specific series of BERT counters.

The BERT statistics show the results of your actions. You can view BERT statistics using the Statistics Manager utility. For information on the Statistics Manager, see *Managing Routers and BNX Platforms*.

Testing All Lines Associated with a Port

With all modules but QMCT1 modules, a line test affects all logical lines associated with a port for the duration of the test. With QMCT1 modules, you can choose whether to test all logical lines associated with a port or to test one individual line.

Follow the instructions in this section all lines associated with a port. To test individual lines for QMCT1 modules, refer to "Testing Individual Logical Lines (QMCT1 Only)," later in this chapter.

Setting the Test Parameters

Before you test the line, you must set the test parameters.

To set the test parameters:

1. **Start at the MCT1 Logical Lines window (refer to Figure 6-14).**
2. **Click on Port Details.**

   The MCT1 Port Parameters window appears (Figure 6-19).

Figure 6-19. MCT1 Port Parameters Window in Dynamic Mode

3. **Click on Line Tests.**

   The Line Tests option appears only in dynamic mode.

   The MCT1 Port Actions window appears (Figure 6-20).

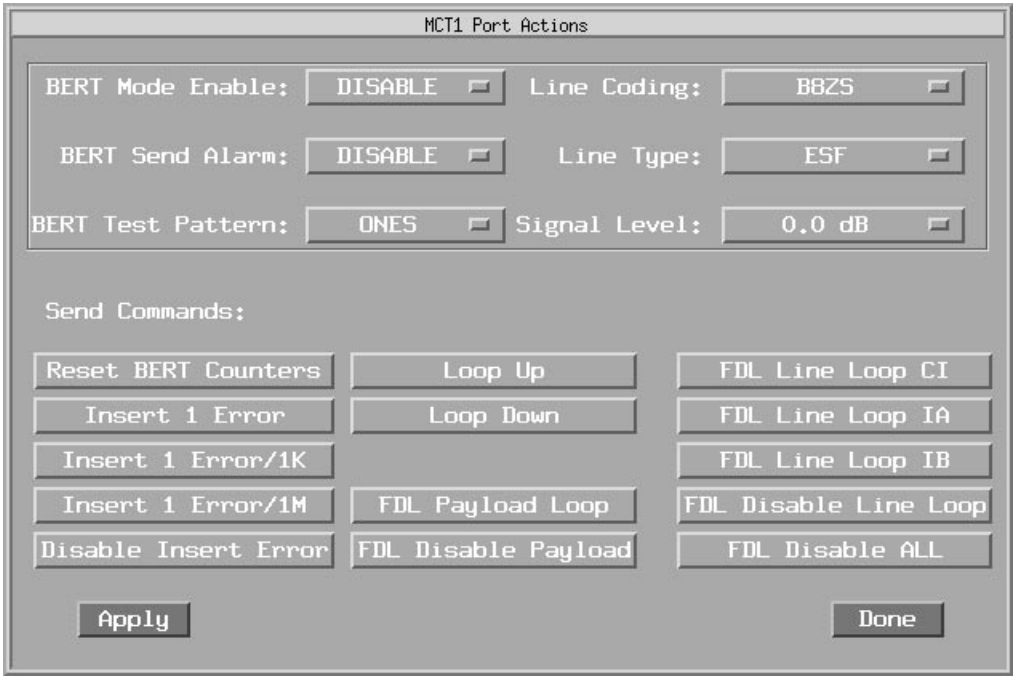

Figure 6-20. MCT1 Port Actions Window

4. **Edit the MCT1 port Action parameters.**

   Refer to the following descriptions for guidelines.

Parameter:	**BERT Mode Enable**
Default:	Disable
Options:	Enable | Disable
Function:	Selecting Enable activates BERT mode.
	You do not need to enable BERT mode to perform non-BERT actions, such as loop actions, from this window.
Instructions:	To enter BERT mode, select Enable and click on Apply.
MIB Object ID:	1.3.6.1.4.1.18.3.4.8.2.1.6

Parameter:	**BERT Send Alarm**
Default:	Disable
Options:	AIS | Yellow | Disable
Function:	Specifies the type of alarm signal to be generated while in BERT mode. Select Disable to disable the generation of alarm messages. Select AIS (Alarm Indication Signal) to transmit Blue alarms (all 1s) or Yellow to transmit Yellow alarms (all 0s).
Instructions:	Select an alarm generation option and click on Apply.
MIB Object ID:	1.3.6.1.4.1.18.3.4.8.2.1.22

Parameter:	**BERT Test Pattern**
Default:	Ones
Options:	Zeros | Ones | QRSS | 2e15 | 2e15 INV | 2e20 | 2e23 | 2e23 INV
Function:	Specifies the bit pattern transmitted during BERT diagnostics. When a port is in BERT mode, it can generate patterns such as all 1s, all 0s, or a QRSS (quasi-random signal sequence) pattern.
Instructions:	Select a test pattern and click on Apply.
MIB Object ID:	1.3.6.1.4.1.18.3.4.8.2.1.21

Parameter: **Line Coding**

Default: B8ZS

Options: AMI | B8ZS

Function: Selects a line coding method. Alternate Mask Inversion (AMI) line coding is bipolar: a binary 0 is transmitted as zero volts and a binary 1 is transmitted as either a positive or negative pulse, opposite in polarity to the previous pulse. (When configured for AMI line coding, the MCT1 link module remains in synchronization upon receiving up to 45 consecutive 0s.)

B8ZS (Bipolar with 8-Zero substitution) line coding replaces a block of eight consecutive binary 0s with an 8-bit B8ZS code containing bipolar violations in the fourth and seventh bit positions of the substituted code. In the receive direction, the B8ZS code is detected and replaced with eight consecutive binary 0s.

Instructions: Specify the line coding method.

MIB Object ID: 1.3.6.1.4.1.18.3.4.8.2.1.10

Parameter: **Line Type**

Default: ESF

Options: SF/D4 | ESF | Unframed T1

Function: Specifies the framing format.

Unframed T1	Use to match the line type.
SF/D4	Transmits superframes consisting of 12 individual frames. If this option is chosen, the FDL port actions do not apply and their buttons do not appear in the MCT1 Port Actions Window.
ESF	Transmits superframes consisting of 24 individual SF/D4 frames and provides enhanced signaling and synchronization.

Instructions: Select ESF or SF/D4 based on the frame format required by the associated T1 equipment.

MIB Object ID: 1.3.6.1.4.1.18.3.4.8.2.1.9

Parameter: **Signal Level (dB)**

Default: 0.0

Options: -15 dB | -7.5 dB | 0.0 dB | 0.5 dB | 0.8 dB | 1.1 dB | 1.5 dB

Function: Specifies the T1 transmit power level in decibels (dB). The DS1 values of -15 and -7.5 dB are long-haul; the carrier determines these values if 0.0 dB is not sufficient.

The DSX1 values of 0.0, 0.5, 0.8, 1.1, and 1.5 dB are short-haul and correlate with cable length as follows:

0.0 dB	0 to 133 ft
0.5 dB	133 to 266 ft
0.8 dB	266 to 399 ft
1.1 dB	399 to 533 ft
1.5 dB	533 to 655 ft

Instructions: Specify the decibel level according to the length of the cable or as determined by the carrier.

MIB Object ID: 1.3.6.1.4.1.18.3.4.8.2.1.15

Running the Tests

When you have set the test parameters, you can test the line.

Caution: *Initiating line tests affects all logical lines associated with that port for the duration of the testing.*

To test the MCT1 line:

1. **Start at the MCT1 Port Actions window (refer to Figure 6-20).**
2. **Click on the appropriate Send Command.**

   Refer to Table 6-1 for a list of the commands and their functions.
3. **Click on Apply.**

Caution: *Wait until the MCT1 Port Actions window updates before selecting another action.*

4. **Repeat Steps 2 and 3 for each test you want to run.**
5. **Click on Done.**

   The MCT1 Port Parameters window appears (refer to Figure 6-19). All changes you apply to the port in the MCT1 Port Actions window are effective only while the window is active. When you exit the MCT1 Port Actions window, all port settings revert to the original port settings.

Table 6-1. Send Commands for BERT Mode

Send Command	Function
Reset BERT Counters	Resets all counters to 0
Insert 1 Error	Inserts a single (non-repeating) error into the bit stream
Insert 1 Error/1K	Inserts a deliberate error into every thousandth position in the bit stream
Insert 1 Error/1M	Inserts a deliberate error into every millionth position in the bit stream
Disable Insert Error	Stops the insertion of deliberate errors into the bit stream
Loop Up	Sends a loop-up code to the remote end
Loop Down	Sends a loop-down code to the remote end
FDL Payload Loop	Transmits a payload loopback activate code to the remote end
FDL Disable Payload	Transmits a payload loopback deactivate code to the remote end
FDL Line Loop CI	Transmits a line loopback activate code (format CI) to the remote end
FDL Line Loop IA	Transmits a line loopback activate code (format IA) to the remote end
FDL Line Loop IB	Transmits a line loopback activate code (format IB) to the remote end
FDL Disable Line Loop	Transmits a line loopback deactivate code to the remote end
FDL Disable All	Transmits a loopback deactivate code to deactivate all types of FDL-initiated loopbacks

Testing Individual Logical Lines (QMCT1 Only)

With QMCT1 modules, you can test one individual line associated with a port. When you are working with a QMCT1 module, and you click on Line Tests in the MCT1 Port Parameters window (refer to Figure 6-19), the QMCT1 Port Actions window appears (Figure 6-21).

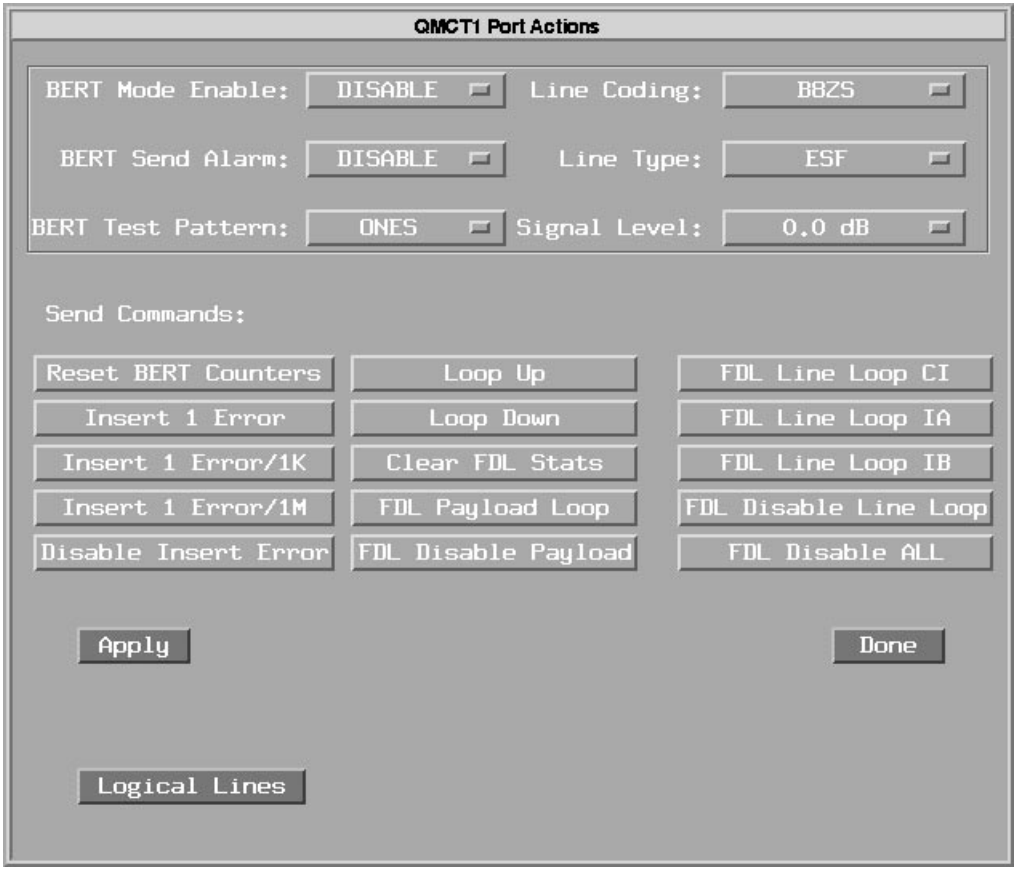

Figure 6-21. QMCT1 Port Actions Window

Setting Test Parameters

Before you test the line, you must set the test parameters.

To set the test parameters:

1. **Start at the QMCT1 Port Actions window (refer to Figure 6-21).**
2. **Click on Logical Lines.**

   The QMCT1 Logical Line Actions window appears (Figure 6-22).

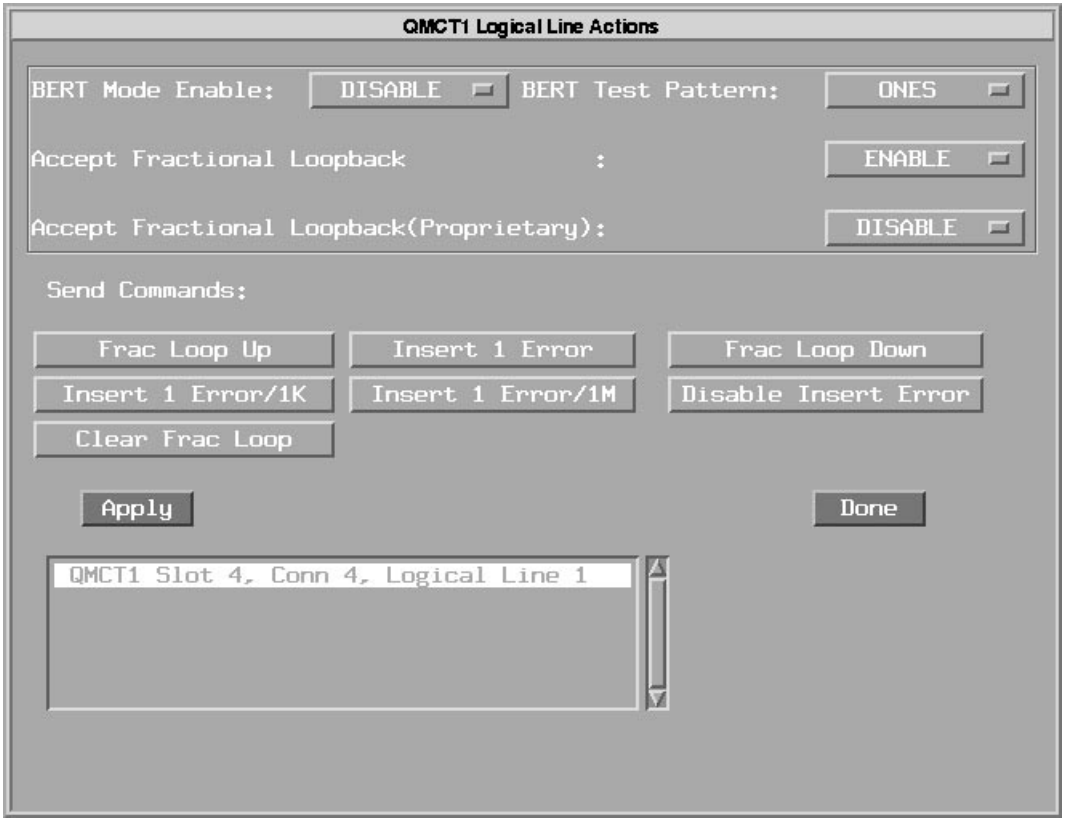

Figure 6-22. QMCT1 Logical Line Actions Window

3. **Edit the Logical Line Action parameters.**

   Use the following parameter descriptions as guidelines.

Parameter:	**BERT Mode Enable**
Default:	Disable
Options:	Enable | Disable
Function:	Selecting Enable activates BERT mode. You do not need to enable BERT mode to perform non-BERT actions, such as loop actions, from this window.
Instructions:	To enter BERT mode, select Enable and click on Apply.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.62

Parameter:	**BERT Test Pattern**
Default:	Ones
Options:	Zeros | Ones | QRSS | 2e15 | 2e15 INV | 2e20 | 2e23 | 2e23 INV
Function:	Specifies the bit pattern transmitted during BERT diagnostics. When a port is in BERT mode, it is capable of generating patterns such as all 1s, all 0s, or a QRSS (quasi-random signal sequence) pattern.
Instructions:	Select a test pattern and click on Apply.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.63

Parameter:	**Accept Fractional Loopback**
Default:	Enable
Options:	Enable | Disable
Function:	Specifies whether or not the logical line can accept fractional T1 loopback code.
Instructions:	Select Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.64

Parameter:	**Accept Fractional Loopback (Proprietary)**
Default:	Disable
Options:	Enable | Disable
Function:	Specifies whether or not to use diagnostic loopback mode on this circuit. In this mode, the router retransmits received data to the sender.
Instructions:	Select Enable only if you want the port in loopback mode.
MIB Object ID:	1.3.6.1.4.1.18.3.4.9.6.1.10

Running the Tests

When you have set the test parameters, you can test the line.

To test the QMCT1 line:

1. **Start at the QMCT1 Logical Line Actions window (refer to Figure 6-22).**
2. **Click on the appropriate Send Command.**

   Refer to Table 6-2 for a list of the commands and their functions.
3. **Click on Apply.**

Caution: *Wait until the QMCT1 Logical Line Actions window updates before selecting another action.*

4. **Repeat Steps 2 and 3 for each test you want to run.**
5. **Click on Done.**

   The QMCT1 Port Actions window appears (refer to Figure 6-21). All changes you apply to the port via the QMCT1 Logical Line Actions window are effective only while the window is active. When you exit the QMCT1 Logical Line Actions window, all port settings revert to the original port settings.

Table 6-2. Send Commands for BERT Mode

Send Command	Function
Frac Loop Up	Sends a loop-up code to the remote end
Insert 1 Error/1K	Inserts a deliberate error into every thousandth position in the bit stream
Clear Frac Loop	Transmits a loopback deactivate code to the remote end
Insert 1 Error	Inserts a single (non-repeating) error into the bit stream
Insert 1 Error/1M	Inserts a deliberate error into every millionth position in the bit stream
Frac Loop Down	Sends a loop-down code to the remote end
Disable Insert Error	Stops the insertion of deliberate errors into the bit stream

Chapter 7
Configuring Multiline Services

This chapter provides an overview of multiline configurations and describes how to use the Configuration Manager to configure multiline services. Site Manager supports multiline services over the following types of WAN media:

- Synchronous (Bay Networks Standard, PPP, and Frame Relay protocols)
- T1/E1
- MCE1/MCT1
- HSSI

Overview of Multiline Configurations

A *multiline* configuration is a circuit that consists of more than one WAN *data path*. A data path is a connection between two points, and can be a permanent physical line, a dial-up physical line, or a virtual circuit connection.

Using a multiline configuration rather than a single path provides the following advantages

- Greater *bandwidth* between two sites

  Bandwidth is the rate at which traffic travels on the circuit. A multiline circuit has greater bandwidth because traffic can travel via more than one data path.

- Greater degree of fault tolerance

  In a multiline configuration, multiple data paths exist for a single circuit. Consequently, if one data path becomes disabled, traffic can travel over another data path.

The following example illustrates the benefits of using multiline services.

Multiline Example

Suppose that your network uses Bay Networks routers to connect two sites, one in New York City and one in Los Angeles (Figure 7-1). A high volume of important data travels between the two sites via three synchronous lines.

Grouping the three synchronous lines into one multiline circuit would

- Reduce congestion by distributing the volume of traffic more evenly among the three lines
- Decrease the chance of data loss if a connection fails

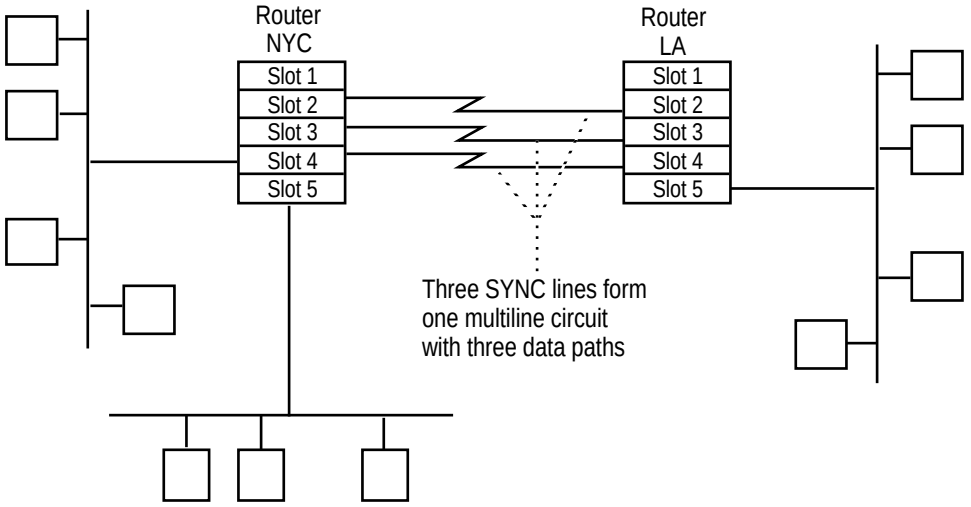

Figure 7-1. Multiline Circuit Composed of Three Synchronous Lines

Types of Multiline Circuits

There are two types of multiline circuits:

- Circuits that include several physical lines
- Circuits on one physical line with several data paths that have separate addresses

In Figure 7-2, Multiline Circuit A groups three synchronous lines into one circuit. Multiline Circuit B consists of just one physical synchronous line, but has three data paths with separate addresses.

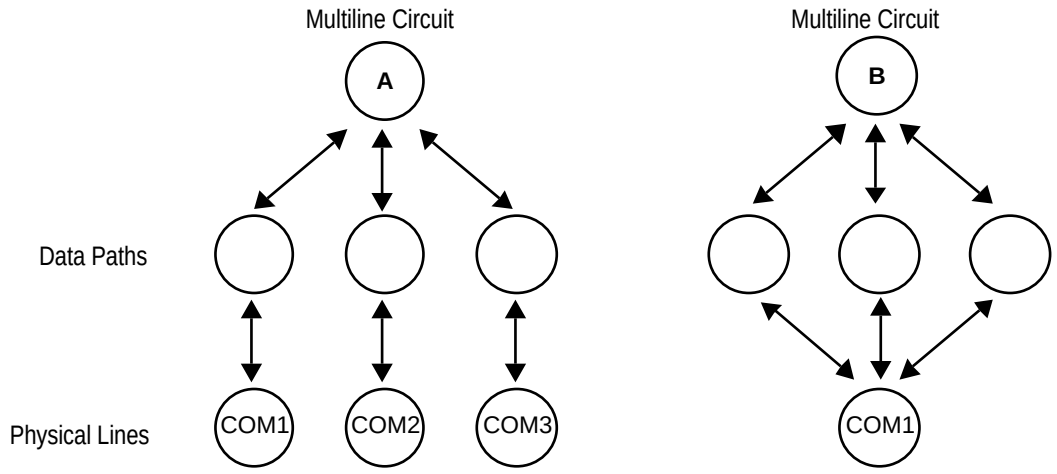

Figure 7-2. Multiline Circuit Types

A multiline circuit reacts to individual data paths coming up and going down by adding to and subtracting from its pool of active data paths, and can operate with some of its data paths down.

Grouping Data Paths

The data paths that form a multiline circuit must share the same bandwidth, Maximum Transmission Unit (MTU), and encapsulation method. T1, E1, MCT1, MCE1, HSSI, and Bay Networks Standard synchronous lines share the same encapsulation method, so you can group any of these lines to form a multiline circuit as long as they share the same bandwidth and MTU.

Frame Relay and PPP each have unique encapsulation methods. You cannot mix these line types with any other line type when you create a multiline circuit.

Multiline Traffic Distribution

To distribute traffic among multiline data paths, you can use one of the following methods:

- Address-based selection
- Random selection

Address-based Selection

If you choose Address-based selection, the router determines the appropriate data path for outbound traffic from the source and destination addresses in individual packets. The router always uses the same data path for any given address pair.

The router determines whether to route or bridge the packet, and then uses the appropriate address. It uses the routing-level addresses for routing traffic, and the MAC-level addresses for bridging traffic.

Address-based selection ensures that all outbound traffic to a particular endstation travels on the same data path, and that packets arrive in the correct sequence. Use this method for protocols that cannot receive packets out of sequence. Note, however, that this option may not result in even traffic distribution across all data paths.

Note: *Address-based selection cannot be used with Frame Relay in group or hybrid access mode. Traffic distribution is automatically changed to random selection.*

Random Selection

If you choose Random selection, the router determines the data path for outbound traffic by using random number generation. With this method, the router

1. Assigns a set of numbers to each data path.
2. Generates a random number for each outbound packet.
3. Sends the packet via the data path with the matching number.

Note: *Random selection provides even distribution across all active data paths in the topology; however, packets traveling on different paths can arrive at their destination out of sequence. Some protocols cannot tolerate packets arriving out of sequence, and as a result, you can experience poor performance or failures. Be sure that random selection is appropriate for your application.*

Frame Relay Considerations

You can configure multiline services for both group access mode and direct access mode Frame Relay PVCs. For more information on using multiline services with Frame Relay, refer to *Configuring Frame Relay Services*.

PPP Multilink

The Bay Networks implementation of PPP includes a *multilink* feature. Multilink is similar to multiline; multilink, however, provides the ability to

- Group lines of different speeds
- Preserves packet sequencing
- Distribute traffic more evenly among the data paths
- Monitor traffic volume

Multilink is particularly beneficial when you configure circuits to access *bandwidth-on-demand* (BOD). For more information on the PPP multilink feature, refer to *Configuring PPP Services*.

Bandwidth-on-Demand (BOD)

You can configure Bay Networks routers to access BOD to reduce line congestion. This feature enables the router to access secondary dial-up lines when the primary leased or dial-up line becomes congested. The router can then transmit excess traffic over the secondary switched lines.

For more information on BOD, refer to *Configuring Dial Services*.

Configuring Multiline

The method you use to configure a multiline circuit depends on the types of lines you need to group.

- For information on how to group up to 31 MCE1 logical lines into a multiline circuit, go to “Grouping Lines into a Multiline Circuit” in Chapter 5.
- For information on how to group up to 24 MCT1 logical lines into a multiline circuit, go to “Grouping Lines into a Multiline Circuit” in Chapter 6.
- For information on how to group up to 16 physical synchronous lines into a multiline circuit, go to “Grouping Physical Synchronous Lines into a Multiline Circuit” or “Adding Physical Synchronous Lines to a Circuit.”
- For information about how to use multiline with Frame Relay, refer to *Configuring Frame Relay Services.*

Grouping Physical Synchronous Lines into a Multiline Circuit

To group any physical synchronous lines into a multiline circuit:

1. **Start at the Configuration Manager window.**
2. **Click on the appropriate link module connector.**

   You must select an E1, T1, MCT1, MCE1, HSSI, or Synchronous link module connector.

   The Add Circuit window appears (Figure 7-3).

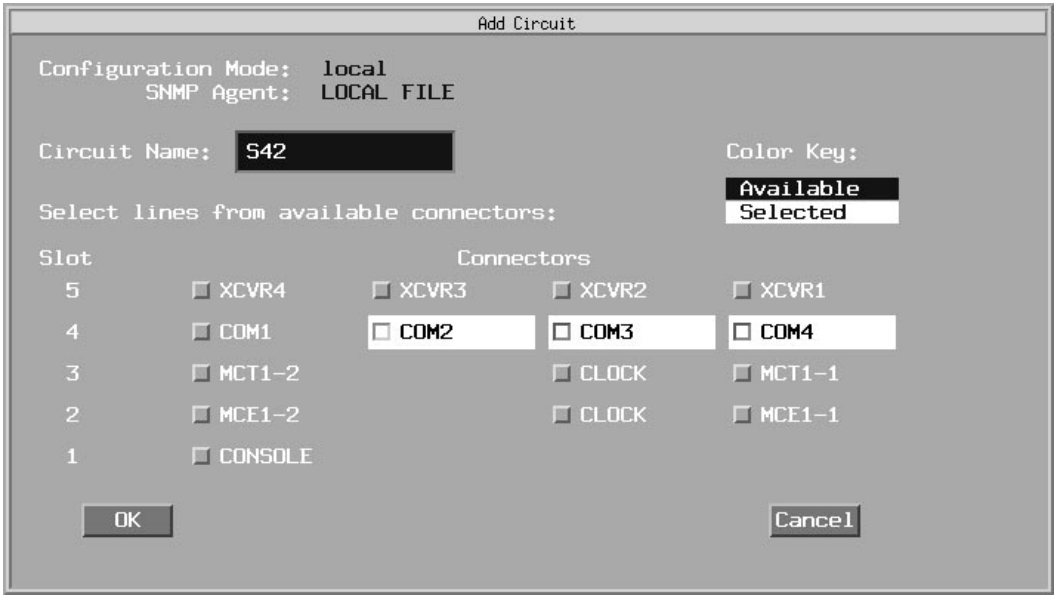

Figure 7-3. Add Circuit Window

3. **Click on the other connectors you want to add to the multiline circuit.**

   You must again select E1, T1, MCT1, MCE1, HSSI, or Synchronous link module connectors.

4. **Click on OK.**

   The connectors that you selected now form a group with a single circuit name. For example, in Figure 7-3, the lines connecting to COM2, COM3, and COM4 now form one circuit called S42, which distributes traffic using address pairs. To change the default traffic distribution method, go to "Changing the Traffic Distribution Method," later in this chapter.

5. **Add the necessary protocols to this circuit.**

   See *Configuring Bridging Services* or the appropriate routing protocol guide for instructions.

Adding Physical Synchronous Lines to a Circuit

The data paths that form a multiline circuit must share the same bandwidth, Maximum Transmission Unit (MTU), and encapsulation method. T1, E1, MCT1, MCE1, HSSI, and Bay Networks Standard synchronous lines share the same encapsulation method, so you can group any of these lines to form a multiline circuit as long as they share the same bandwidth and MTU.

To add a physical synchronous line to an existing circuit on which you have configured protocols:

1. **Start at the Configuration Manager window.**
2. **Click on the connector of the circuit to which you are adding lines.**

   The Edit Connector window appears.
3. **Click on Edit Circuit.**

   The Circuit Definition window appears (Figure 7-4).

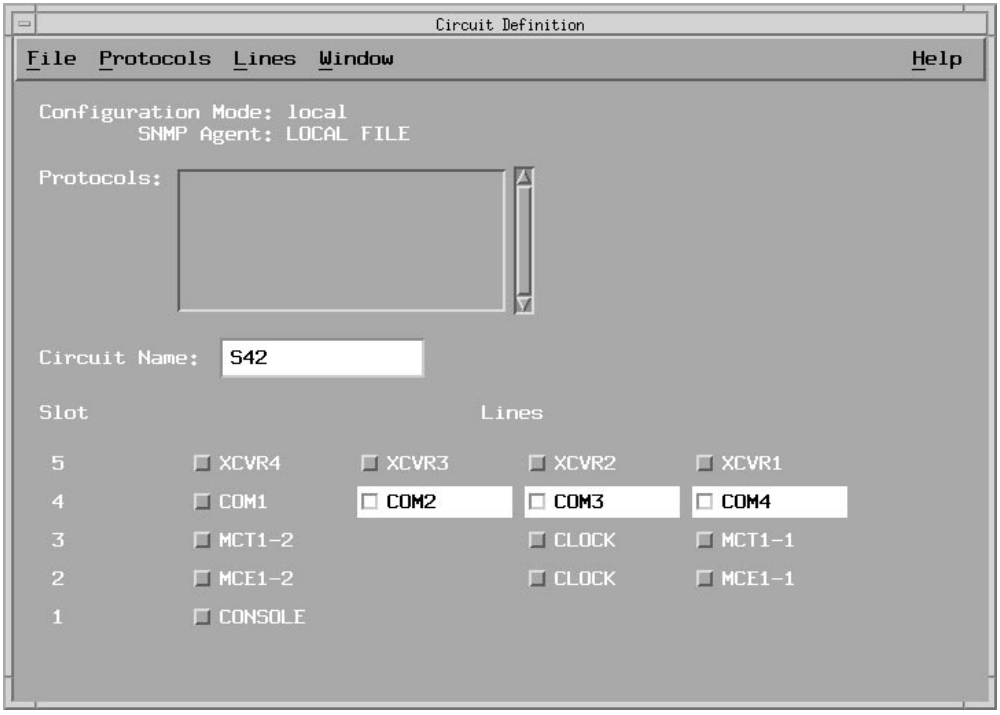

Figure 7-4. Circuit Definition Window

4. **Click on the connectors that you are adding to the circuit.**

   Site Manager highlights the connectors you choose. For example, Figure 7-4 illustrates the addition of COM2 to the circuit S42 that already uses connectors COM3 and COM4.

5. **Select Lines→Change Lines (Figure 7-5).**

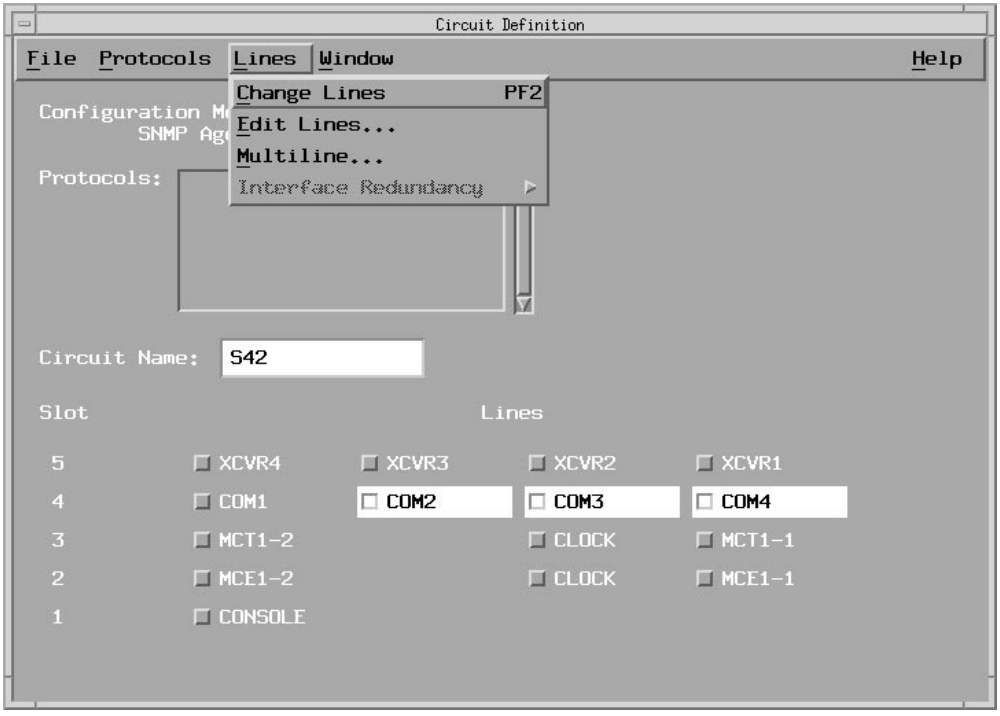

Figure 7-5. Change Lines Menu Option

The lines now form one circuit. The default traffic distribution method is address-based. If you want to change the traffic distribution method, go to "Changing the Traffic Distribution Method," later in this chapter.

6. **Select File→Exit to exit this window.**

Changing the Traffic Distribution Method

All multiline circuits, by default, distribute traffic using address pairs. To change the traffic distribution method:

1. **Start at the Configuration Manager window.**
2. **Click on one of the connectors in the appropriate multiline circuit.**

   The Edit Connector window appears.
3. **Click on Edit Circuit.**

   The Circuit Definition window appears (refer to Figure 7-5).
4. **Select Lines→Multiline.**

   The Edit Multiline Options window appears (Figure 7-6), displaying the circuit number in its title.

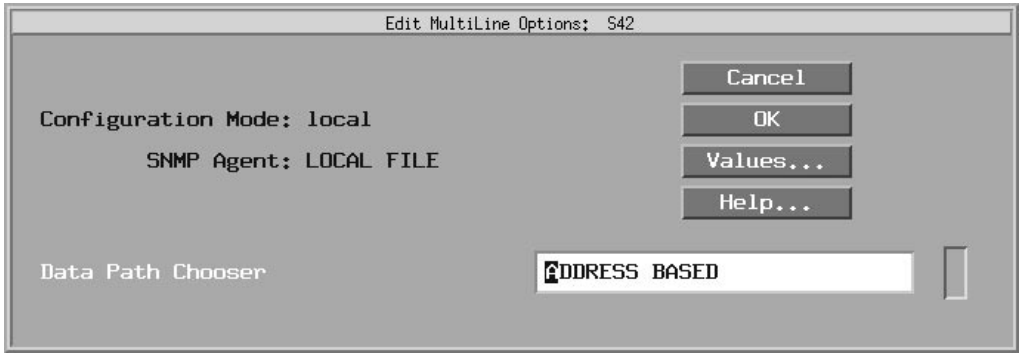

Figure 7-6. Edit Multiline Options Window

5. **Edit the Data Path Chooser parameter.**

   See the parameter description following this procedure for guidelines.
6. **Click on OK.**

Parameter:	**Data Path Chooser**
Default:	Address Based
Options:	Address Based | Random
Function:	Specifies how this multiline circuit distributes outbound traffic over its data paths. If you select Address Based, the router always uses the same data path to send traffic between the same source and destination address. This method ensures that packets arrive in the correct sequence. If you select Random, the router assigns a set of numbers to each data path. The router then generates a random number for each outbound packet, and assigns the packet to the data path with the matching number. This method ensures even distribution of traffic among the data paths in a multiline circuit, but does not ensure that packets arrive in the correct sequence.
Instructions:	Select Address Based or Random.
MIB Object ID:	1.3.6.1.4.1.18.3.5.1.4.1.1.23

Chapter 8
Managing Line Resources

The first part of this chapter provides an overview of line resource management. Later sections explain how to use the Configuration Manager to enable the Line Resource Manager (LRM) and edit Line Resource parameters to

- Reserve resources for ST2 traffic
- Customize the line resource queues
- Manage multiline resources

For each line resource parameter, this chapter provides information about default settings, valid parameter options, the parameter function, instructions for setting the parameter, and the MIB object ID.

The Technician Interface allows you to modify parameters by issuing **set** and **commit** commands with the MIB object ID. This process is equivalent to modifying parameters using Site Manager. For more information about using the Technician Interface to access the MIB, refer to *Using Technician Interface Software.*

Caution: *The Technician Interface does not verify that the value you enter for a parameter is valid. Entering an invalid value can corrupt your configuration.*

Overview of Line Resource Management Services

Emerging realtime multicast applications that involve digitized voice and video (such as multimedia conferencing and virtual reality) require a level of consistent network service that routers cannot meet using simple first-in-first-out (FIFO) queuing mechanisms. The existing best-effort delivery service of IP networks, where variable queuing delays and data loss due to congestion are acceptable, is not sufficient.

New network protocols need to address the requirements of delay-sensitive applications. Resource reservation protocols such as Stream Protocol 2 (ST2) distribute information among routers to achieve a guaranteed Quality of Service (QoS) that satisfies the data-rate and delay characteristics of specific packet streams (flows).

As protocols begin to allow a guaranteed QoS, network administrators need to explicitly manage their network's bandwidth to both meet the increasing demands of realtime applications and maintain bandwidth for other traffic.

Line Resource Manager (LRM)

The Line Resource Manager (LRM) is part of the Bay Networks router Circuit Resource Manager (CRM) feature. LRM lets you define a certain percentage of a particular line's bandwidth as *reservable*. Applications that require a guaranteed QoS can negotiate for the reservable bandwidth. When the router honors a reservation request, the LRM allocates bandwidth from the reservable bandwidth, reducing the bandwidth available for other requests.

Supported Media

You can enable the LRM on 10-Mb/s Ethernet, MCT1, HSSI, and other synchronous interfaces. LRM supports the following synchronous interface encapsulation methods:

- Point-to-Point Protocol (PPP)
- Bay Networks Standard
- Frame Relay
- ATM DXI

Note: *You cannot use line resource management on a line you configured for PPP multilink.*

How LRM Works with ST2

The following summarizes the exchange between the ST2 agent and the LRM.

1. The router receives an ST2 connect request.

   The ST2 connect request includes a flow specification (*flowspec*) that indicates the resources needed to meet the QoS.

2. ST2 passes the flowspec to the LRM.
3. The LRM compares the requested resources with available reservable bandwidth.

   LRM determines reservable bandwidth from configured values described later in this chapter. It also accounts for any active reserved flows.

4. The LRM either reserves the necessary services or refuses service.

Enabling the Line Resource Manager

Before you can enable the LRM or reserve resources for ST2 traffic, you must first configure IP and the ST2 agent on a circuit, as described in *Configuring ST2 Services*.

To enable LRM on an MCT1 line, first go to "Accessing LRM on an MCT1 Line," later in this chapter.

To enable the LRM for reserving and allocating bandwidth:

1. **Start at the Configuration Manager window.**
2. **Click on the appropriate circuit connector.**

   You must select an XCVR (10-Mb/s Ethernet), HSSI, MCT1, or COM connector for a line configured for ST2.

   The Edit Connector window appears (Figure 8-1).

Figure 8-1. Edit Connector Window

3. **Click on Edit Line Resources.**

   Unless you have previously enabled line resources on this connector, the following Site Manager prompt appears (Figure 8-2):

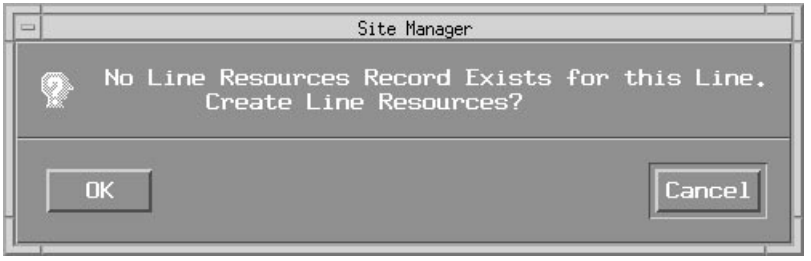

Figure 8-2. Creating the Line Resources Record

4. **Click on OK.**

   The Edit Line Resources window appears (Figure 8-3).

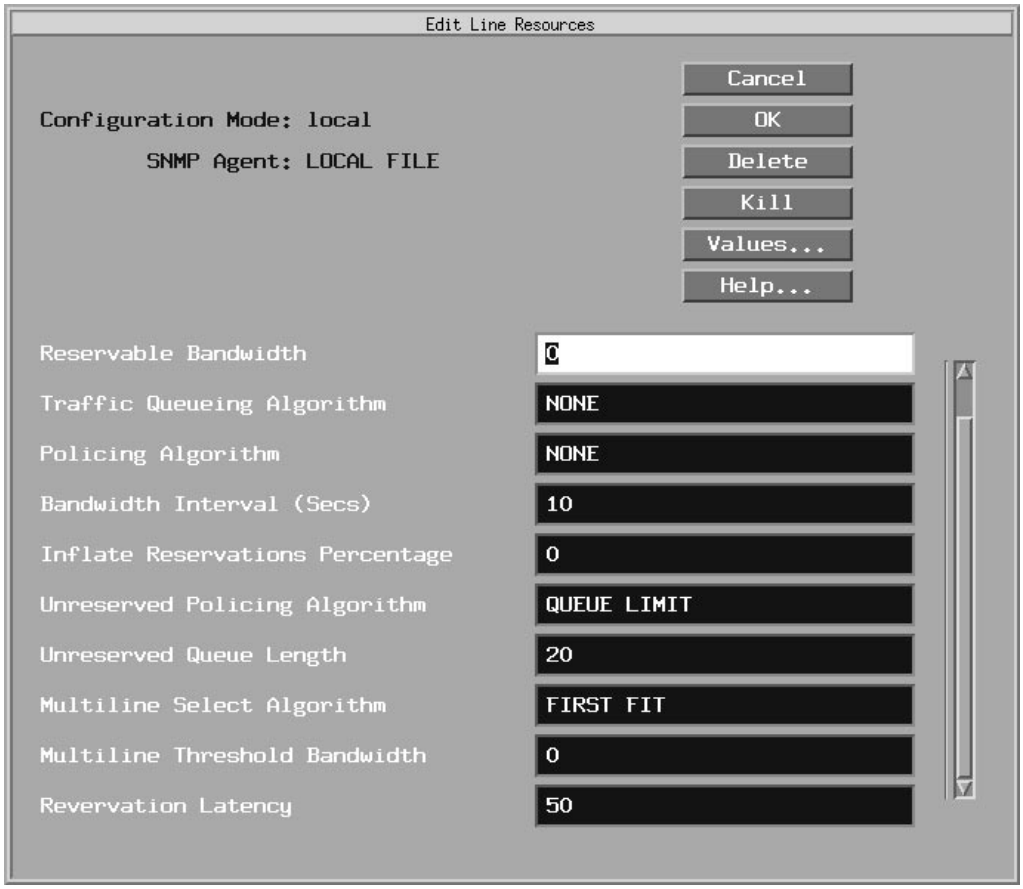

Figure 8-3. Edit Line Resources Window

5. **Edit the Estimated Bandwidth and Reservable Bandwidth parameters.**

   To activate the LRM, enter an estimated bandwidth value greater than 0. To activate resource reservation, enter the portion of this line's bandwidth you want to make available for ST2 requests for guaranteed service. See the parameter descriptions following this procedure for information.

Caution: *Never make all available bandwidth reservable. Leave at least 15% of bandwidth available for network management, routing protocols, and other best-effort traffic.*

6. **If this is a multiline circuit, configure multiline resource reservation parameters.**

   To configure resource reservation on multiline circuits, edit the Multiline Select Algorithm and Multiline Threshold Bandwidth parameters. See the parameter descriptions following this procedure for information.

7. **Modify or verify the default queuing of traffic for reserved and unreserved bandwidth.**

   To configure default queuing of reserved traffic, edit the Traffic Queuing Algorithm, Policing Algorithm, Bandwidth Interval, and Inflate Reservations Percentage parameters. To configure default queuing of unreserved traffic, edit the Unreserved Policing Algorithm and Unreserved Queue Length parameters. See the parameter descriptions following this procedure for information.

8. **Modify or verify the maximum latency for a reserved-flow packet.**

   Edit the Reservation Latency parameter. See the parameter descriptions following this procedure for information.

9. **Click on OK.**

Parameter:	**Estimated Bandwidth**
Default:	0
Range:	0 to 214748364 bits/s
Function:	Specifies the estimated usable bandwidth for this line.
Instructions:	Enter the estimated total bandwidth for this line in bits/s. To enable line resource management, enter a value greater than zero. For point-to-point lines, you can usually enter the total line speed. For an Ethernet line, you must estimate a value, because shared-media lines may not have all of the bandwidth available. You can base the estimate on line statistics, the number of connected workstations, or other site-specific information.
MIB Object ID:	1.3.6.1.4.1.18.3.5.16.2.1.3.1.3

Parameter:	**Reservable Bandwidth**
Default:	0
Range:	0 to 214748364 bits/s
Function:	Specifies the reservable bandwidth for this line.
Instructions:	To enable ST2 reservable resources, enter the portion of this line's bandwidth you want to make available for ST2 requests for guaranteed service. The value must be greater than 0 and less than the value of the Estimated Bandwidth parameter. Do not make all available bandwidth reservable; leave at least 15% for network management and routing protocols.
MIB Object ID:	1.3.6.1.4.1.18.3.5.16.2.1.3.1.4

Parameter:	**Traffic Queuing Algorithm**
Default:	None
Options:	None | Priority
Function:	Specifies the queuing algorithm for all reserved traffic.
Instructions:	Select None to use best-effort scheduling. Use best-effort scheduling if you want to use the resource reservation protocol (ST2) to control admission of flows to the network, but do not want to explicitly schedule each flow's packets. Select Priority to schedule reserved traffic ahead of non-reserved traffic.
MIB Object ID:	1.3.6.1.4.1.18.3.5.16.2.1.3.1.5

Parameter:	**Policing Algorithm**
Default:	None
Options:	None | Leaky Bucket
Function:	Specifies whether or not to use the Leaky Bucket policing algorithm for reserved traffic. With Leaky Bucket policing, LRM makes sure that all ST2 packets using reserved bandwidth follow the flowspec that appears in the ST2 connect request. LRM discards any packets that do not adhere to the flowspec. Note that such policing requires additional processing by the router.
Instructions:	Select None to bypass policing if an upstream router is policing traffic, or if the applications generating the reserved traffic consistently adhere to the flowspec and do not require policing. Enter Leaky Bucket to apply a “Leaky Bucket” policing algorithm to reserved traffic.
MIB Object ID:	1.3.6.1.4.1.18.3.5.16.2.1.3.1.6

Parameter:	**Bandwidth Interval (Secs)**
Default:	10 seconds
Range:	1 to 214748364 seconds
Function:	Specifies the interval over which LRM measures instantaneous bandwidth.
Instructions:	Enter a time interval in seconds if the default value of 10 seconds is not sufficient.
MIB Object ID:	1.3.6.1.4.1.18.3.5.16.2.1.3.1.7

Parameter:	**Inflate Reservations Percentage**
Default:	0
Range:	0 to 100 percent
Function:	Specifies that LRM adds a safety buffer to each ST2 reservation on this line by increasing bandwidth requests by a specified percentage.
Instructions:	To inflate reservations made on this line, enter a percent value to increase each bandwidth request. Increase the value of this parameter if you notice that the LRM is discarding packets because applications generating reserved traffic are exceeding their flowspecs.
MIB Object ID:	1.3.6.1.4.1.18.3.5.16.2.1.3.1.8

Parameter:	**Unreserved Policing Algorithm**
Default:	Queue Limit
Options:	Queue Limit | Leaky Bucket
Function:	Specifies the policing algorithm for unreserved traffic. The Queue Limit option restricts the number of buffers (packets) of unreserved traffic that LRM queues. This method of policing enables unreserved traffic to use available reserved bandwidth. The Unreserved Queue Length parameter specifies the maximum number of packets in the queue. The Leaky Bucket option causes the router to actively police the unreserved traffic based on the unreserved bandwidth. This method does not allow unreserved traffic to take advantage of available reserved bandwidth. If you enable priority queuing for this line, the router uses the priority queue parameters to perform Queue_Limit policing. See *Configuring Traffic Filters and Protocol Prioritization* for information about priority queue parameters.
Instructions:	Select Queue Limit or Leaky Bucket.
MIB Object ID:	1.3.6.1.4.1.18.3.5.16.2.1.3.1.9

Parameter:	**Unreserved Queue Length**
Default:	20
Range:	0 to 214748364 packets (limited by available buffers)
Function:	If the Unreserved Policing Algorithm parameter is set to Queue Limit, this parameter specifies the maximum number of unreserved (best-effort) packets to be held in queue for transmission. After the queue length reaches this value, the router discards best-effort traffic when congestion occurs. Priority queuing limits, if configured, override the value of this parameter.
Instructions:	Change this value to adjust the queue length limit.
MIB Object ID:	1.3.6.1.4.1.18.3.5.16.2.1.3.1.10

Parameter:	**Multiline Select Algorithm**
Default:	First Fit
Options:	First Fit | Round Robin
Function:	Specifies how LRM selects which line to use for a new resource request, if you have LRM configured on a multiline circuit.
Instructions:	Set this parameter only if you configured LRM on a multiline circuit. Select First Fit to always use the first available line that can service reserved traffic requests. Select Round Robin to rotate the use of lines available to service requests. All lines for a circuit must use the same algorithm. If any one line on a circuit specifies First Fit, all lines use the first-fit algorithm.
MIB Object ID:	1.3.6.1.4.1.18.3.5.16.2.1.3.1.11

Parameter:	**Multiline Threshold Bandwidth**
Default:	0
Range:	0 to 214748364 bits/s
Function:	Specifies how the first-fit algorithm works, providing you set the Multiline Select Algorithm parameter to First Fit. If you accept the default value, LRM uses the simple first-fit algorithm. If you select a value greater than 0, LRM still uses the first available line with reservable bandwidth to service requests, but moves to the next available line after reaching the configured threshold. When all lines are at their threshold, LRM returns to using the simple first-fit algorithm.
Instructions:	Set this parameter only if you have configured LRM on a multiline circuit and have set the Multiline Select Algorithm parameter to First Fit. Accept the default or enter a number less than the value of the Reservable Bandwidth parameter.
MIB Object ID:	1.3.6.1.4.1.18.3.5.16.2.1.3.1.12

Parameter:	**Reservation Latency**
Default:	50
Range:	0 to 214748364 milliseconds
Function:	Specifies the maximum latency for a reserved flow packet, limiting the amount of unreserved data that the link scheduler can transmit. When the data transmit ring reaches a size where the time to transmit the data is greater than the value of this parameter, no more unreserved data will be queued.
Instructions:	Reduce the value of this parameter to obtain better delay characteristics for reserved flows, but note that overall throughput may decrease. Increase the default value to improve throughput, but note that reserved-flow delays may increase.
MIB Object ID:	1.3.6.1.4.1.18.3.5.16.2.1.3.1.13

Accessing LRM on an MCT1 Line

Before you can enable the LRM or reserve resources for ST2 traffic, you must first configure IP and the ST2 agent on a circuit, as described in *Configuring ST2 Services*.

To activate line resource management for an MCT1 line:

1. **Start at the Configuration Manager window.**
2. **Click on the appropriate circuit connector.**

   You must select a line configured for ST2.

   The MCT1 Port Parameters window appears (Figure 8-4).

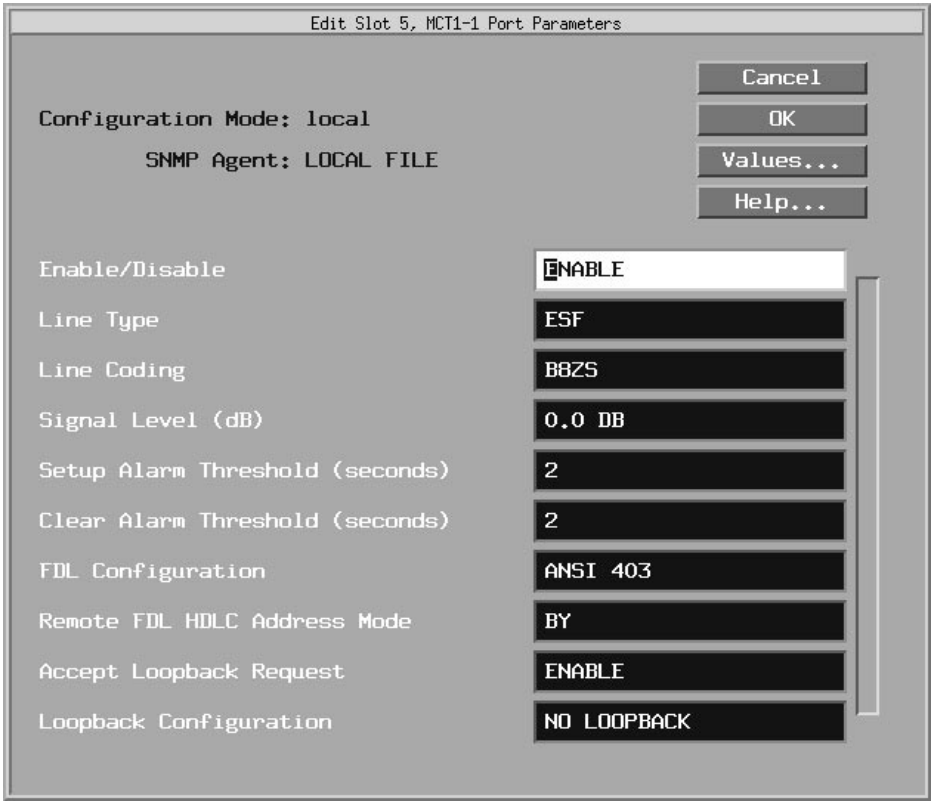

Figure 8-4. MCT1 Port Parameters Window

3. **Click on OK.**

   The MCT1 Logical Lines window appears (Figure 8-5).

Figure 8-5. MCT1 Logical Lines Window

4. **Select the Line Resources box.**
5. **Click on Values.**

   Unless you have previously enabled line resources on this connector, create the line resources record when prompted (refer to Figure 8-2).

   The Edit Line Resources window appears (refer to Figure 8-3).

6. **Proceed with Step 5 in "Enabling the Line Resource Manager."**

   You manage MCT1 line resource reservations as you do for any other line.

Disabling Line Resource Management

You can use the Configuration Manager to remove a line's resource reservation services or to delete the line resource record and completely disable LRM on a line.

Removing a Line's Reservations

To remove all outstanding reservations for a particular line:

1. **Start at the Configuration Manager window.**
2. **Click on the appropriate circuit connector.**

   The Edit Connector window appears (refer to Figure 8-1).
3. **Click on Edit Line Resources.**

   The Edit Line Resources window appears (refer to Figure 8-3).
4. **Click on Kill.**

   Site Manager displays the following message (Figure 8-6):

Figure 8-6. Killing a Line's Reserved Resources

5. **Click on OK.**

Deleting LRM Services

To delete the line resource record and completely disable LRM on a circuit:

1. **Start at the Configuration Manager window.**
2. **Click on the appropriate circuit connector.**

   The Edit Connector window appears (refer to Figure 8-1).

3. **Click on Edit Line Resources.**

   The Edit Line Resources window appears (refer to Figure 8-3).

4. **Click on Delete.**

   Site Manager displays the following message (Figure 8-7):

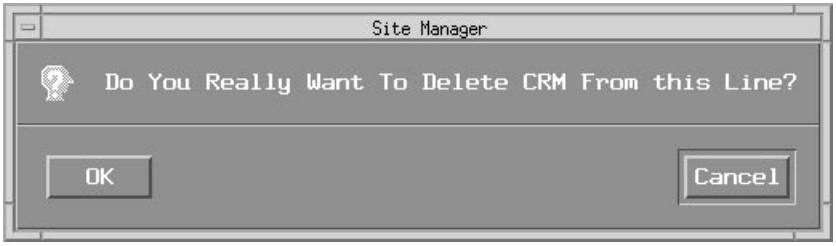

Figure 8-7. Deleting the CRM Line Resource Record

5. **Click on OK.**

   The Configuration Manager window appears.

The next time you select Edit Line Resources for this line in the Edit Connector window (refer to Figure 8-1), Site Manager will prompt you to re-create the line resource record. You can reconfigure resource reservation by completing the steps in "Enabling the Line Resource Manager," earlier in this chapter.

Appendix A
Site Manager Default Line Parameter Settings

This appendix lists the default settings for line detail, multiline, and LRM parameters. Use the Configuration Manager to edit any of the Site Manager default settings.

E1 Line Parameters

Table A-1. E1 Line Parameters

Parameter	Default
Enable	Enable
Line Type	E1
HDB3S Support	Disable
Clock Mode	Internal
Mini Dacs	Idle

Ethernet Line Parameters

Table A-2. Ethernet Line Parameters

Parameter	Default
Enable	Enable
BOFL Enable	Enable
BOFL Timeout	5 s

(continued)

Table A-2. Ethernet Line Parameters *(continued)*

Parameter	Default
Hardware Filter (10-Mb/s Ethernet only)	Disable (this default is changed to Enable if you add a circuit and reply OK to the prompt `Do you want to enable Hardware Filters on this circuit?`)
Interface Line Speed (100-Mb/s Ethernet only)	100BASE-TX/100BASE-FX
Line Advertising Capabilities (100-Mb/s Ethernet only)	11

FDDI Line Parameters

Table A-3. FDDI Line Parameters

Parameter	Default
Enable	Enable
BOFL Enable	Enable
BOFL Timeout	3 s
Hardware Filter	Disable (this default is changed to Enable if you add a circuit and reply OK to the prompt `Do you want to enable Hardware Filters on this circuit?`)

Table A-4. FDDI SMT Attribute Parameters

Parameter	Default
Connection Policy	0xff65
T_Notify Timeout (s)	22 s
Trace Max Expiration (ms)	7000 ms (7 s)
Status Report Protocol	Enable
Duplicate Address Protocol	Enable
User Data	None

Table A-5. FDDI MAC Attribute Parameters

Parameter	Default
LLC Data Enable	Enable

Table A-6. FDDI Path Attribute Parameters

Parameter	Default
Tvx Lower Bound (ms)	2.5 ms
T_Max Lower Bound (ms)	165 ms
Requested TTRT (ms)	165 ms

Table A-7. FDDI Port Attribute Parameters

Parameter	Default
LER Cutoff	7
LER Alarm	8

HSSI Line Parameters

Table A-8. HSSI Line Parameters

Parameter	Default
Enable	Enable
BOFL	Enable
BOFL Frequency	1 s
MTU	4608
WAN Protocol	None
Transmission Interface	DS3
External Clock Speed	46359642 (44.736 MB/s)
CRC Size	32 bit

T1 Line Parameters

Table A-9. T1 Line Parameters

Parameter	Default
Enable	Enable
Frame Type	ESF
B8ZS Support	Disable
Line Buildout	1
Clock Mode	Internal
Mini Dacs	Idle

Token Ring Line Parameters

Table A-10. Token Ring Line Parameters

Parameter	Default
Enable	Enable
MAC Address Override	None
MAC Address Select	PROM
Speed	16 MB/s
Early Token Release	Enable

ATM FRE2 Line Parameters

Table A-11. ATM FRE2 Line Parameters

Parameter	Default
Enable	Enable
Data Path Notify	Enable
Data Path Notify Timeout	3 s
SVC Inactivity Timeout Enable	Enable
SVC Inactivity Timeout (Secs)	1200 s

Table A-12. ATM FRE2 Physical Attribute Parameters

Parameter	Default
Framing Mode	SONET
Scrambling	Enable
Loopback	Disable
Cell Insertion	Unassigned

ATM ARE Line Parameters

Table A-13. ATM ARE Line Parameters

Parameter	Default
Enable	Enable
Interface MTU	4608
Data Path Enable	Enable
Data Path Notify Timeout	1 s
SVC Inactivity Timeout Enable	Enable
SVC Inactivity Timeout (Secs)	1200 s
Framing Mode	SONET
Clocking Signal Source	Internal
DS3 Line Build Out	Short
DS3 Scrambling	On

Synchronous Line Parameters

Table A-14. Synchronous Line Parameters

Parameter	Default	LAPB Default (X.25 Configured on AN or ASN)
Enable	Enable	Enable
BOFL	Enable (Disable if X.25 is enabled)	Disable
BOFL Timeout	5 s	5 s
MTU	1600	512
Promiscuous	Disable	Enable
Clock Source	External	External
Internal Clock Speed	64 KB	64 KB
External Clock Speed	64102	64102
Signal Mode	Balanced	Balanced
RTS Enable	Disable	Enable
Burst Count	Enable	not applicable
Service	LLC1 (LAPB if X.25 is enabled)	Transparent
Transmit Window Size	1 (7 if X.25 is enabled)	not applicable
Minimum Frame Spacing	1 (7 if X.25 is enabled)	1
Local Address	7 (1 or 3 if X.25 is enabled)	7
Remote Address	7 (1 or 3 if X.25 is enabled)	7
WAN Protocol	None	LAPB
Pass Thru Local Address	None	None
Pass Thru Remote Address	None	None
CRC Size	16 bit	16 bit
Sync Media Type	Default	Default
Sync Polling	Disable (Enable if X.25 is enabled)	Disable
Sync Line Coding	NRZ	NRZ
KG84A Cycle	100 ms	100 ms

(continued)

Table A-14. Synchronous Line Parameters *(continued)*

Parameter	Default	LAPB Default (X.25 Configured on AN or ASN)
KG84A Sync Loss Interval	50	50
KG84A Remote Resync Wait	200	200
KG84A Sync Pulse	10 ms	10 ms
Network Link Level	NET2	not applicable
Retry Count	16	not applicable
Link Idle Timer	9 s	not applicable
Extended Control (S and I frames)	Disable	not applicable
Idle RR Frames	Off	not applicable
Cable Type	Null	Null
Retry Timer	300 tenths of a second	not applicable
Extended Address	Disable	Disable
Remote Loopback Detection	Disable	Disable
Sync Hold Down Time	0 s	0 s
Sync Priority	1	1

LAPB Parameters

Table A-15. LAPB Parameters

Parameter	Default
Enable	Enable
Station Type	DTE
Control Field	Modulo 8
Max N1 Frame Size (octets)	1600
Window Size	7
Max N2 Retries	10
Max T1 Acknowledge Timer (seconds)	3 s
Max T2 Acknowledge Timer (seconds)	1 s

(continued)

Table A-15. LAPB Parameters *(continued)*

Parameter	Default
Max T3 Disconnect Timer (seconds)	60 s
Initiate Link Setup Action	Active
Enable Rx/Tx of XID Frames	Enable
Idle RR Frames	Off
Command/Response Address	DTE
WAN Protocol	Standard

Asynchronous Line Parameters

Table A-16. Asynchronous Line Parameters

Parameter	Default
Enable	Enable
MTU	1000
Start Protocol	Answer
Remote IP Addr	None
Remote Port	7
Local Port	2100
Baud Rate	9600
Idle Timer	20 s
Receive Window	4096
TCP KeepAlive	8 s
TCP Inactive Limit	300 s
Cfg TxQ Length	None
Cfg RxQ Length	None

MCE1 Line Parameters

Table A-17. MCE1 Clock Parameters

Parameter	Default
Primary Clock	Port 1 Ext Loop
Secondary Clock	Internal

Table A-18. MCE1 Port Application Parameters

Parameter	Default
Port Application Mode	NONPRI

Table A-19. MCE1 Port Parameters

Parameter	Default
Enable/Disable	Enable
Line Type	E1
Line Coding	HDB3
Setup Alarm Threshold (seconds)	2 s
Clear Alarm Threshold (seconds)	2 s
International Bit	Disable
Line Impedance	120

Table A-20. MCE1 Logical Line Parameters

Parameter	Default
Enable/Disable	Enable
Breath of Life (BOFL) Enable/Disable	Enable
BOFL Timeout (seconds)	5 s

(continued)

Table A-20. MCE1 Logical Line Parameters *(continued)*

Parameter	Default
Fractional Loopback	Disable
WAN Protocol	Standard
Service	LLC1
Local HDLC Address	7
Remote HDLC Address	7
Rate Adaptation	64 K LSB
Interframe Time Fill Character	Flags
CRC Size	16 bit CRC
MTU Size (bytes)	1600

Table A-21. MCE1 Port Action Parameters

Parameter	Default
BERT Mode Enable	Disable
BERT Send Alarm	Disable
BERT Test Pattern	Ones
International Bit	Disable
Line Coding	HDB3
Line Type	None

MCT1 Line Parameters

Table A-22. MCT1 Clock Parameters (All Modules except QMCT1)

Parameter	Default
Primary Clock	Port 1 Ext Loop
Secondary Clock	Internal

Table A-23. MCT1 Port Application Parameters

Parameter	Default
Port Application Mode	NONPRI

Table A-24. QMCT1 Clock Parameters

Parameter	Default
Primary Clock	Internal
Secondary Clock	Internal

Table A-25. MCT1 Port Parameters

Parameter	Default
Enable/Disable	Enable
Line Type	ESF
Line Coding	B8ZS
Signal Level (dB)	0.0 dB
Setup Alarm Threshold (seconds)	2 s
Clear Alarm Threshold (seconds)	2 s
FDL Configuration	ANSI 403
Remote FDL HDLC Address Mode	BY
Accept Loopback Request	Enable
Loopback Configuration	No Loopback
Send Performance Measurement CR Addr	prmCi
Accept Perf Measurement CR Addr	prmCi

Table A-26. MCT1 Logical Line Parameters

Parameter	Default
Enable/Disable	Enable
Breath of Life (BOFL) Enable/Disable	Enable
BOFL Timeout (seconds)	5 s
Fractional Loopback	Disable
WAN Protocol	Standard
Service	LLC1
Local HDLC Address	7
Remote HDLC Address	7
Rate Adaptation	56 K LSB
Interframe Time Fill Character	Flags
CRC Size	16 bit CRC
MTU Size (bytes)	1600
Remote Loopback Detection	Disable
Bert Mode	Disable (QMCT1 only)
Bert Test Pattern	Ones (QMCT1 only)
Accept Fractional Loopback Code	Enable (QMCT1 only)
Line Resources	None

Table A-27. MCT1 Port Action Parameters

Parameter	Default
BERT Mode Enable	Disable
BERT Send Alarm	Disable
BERT Test Pattern	Ones
Line Coding	B8ZS
Line Type	ESF
Signal Level	0.0

Table A-28. QMCT1 Logical Line Action Parameters

Parameter	Default
Bert Mode Enable	Disable
Bert Test Pattern	Ones
Accept Fractional Loopback	Enable
Accept Fractional Loopback (Proprietary)	Disable

Multiline Parameters

Table A-29. Multiline Parameters

Parameter	Default
Data Path Chooser	Address Based

Line Resource Parameters

Table A-30. Line Resource Parameters

Parameter	Default
Estimated Bandwidth	0
Reservable Bandwidth	0
Traffic Queuing Algorithm	None
Policing Algorithm	None
Bandwidth Interval (Secs)	10 s
Inflate Reservations Percentage	0
Unreserved Policing Algorithm	Queue Limit
Unreserved Queue Length	20
Multiline Select Algorithm	First Fit
Multiline Threshold Bandwidth	0
Reservation Latency	50 ms

Index

Symbols

100Base-T
  Ethernet line details, 3-6
  media, 1-4
10Base-T
  Ethernet line details, 3-6
  media, 1-4

A

accessing line service parameters, 2-1
address modes, 6-13
addressing, point-to-point connections
  conventions, 4-18
  explicit, 4-19
alarm signal, 5-34, 6-39
AMI line coding
  MCE1, 5-8, 5-35
  MCT1, 6-11, 6-40
ANSI 403, 6-12
Asynchronous
  default parameters, A-8
  editing line details, 4-29
  parameters
    Baud Rate, 4-32
    Cfg RxQ Length, 4-34
    Cfg TxQ Length, 4-34
    Enable, 4-30
    Idle Timer, 4-32
    Local Port, 4-32
    MTU, 4-30
    Receive Window, 4-32
    Remote IP Addr, 4-31
    Remote Port, 4-31
Asynchronous *continued*
    Start Protocol, 4-31
    TCP Inactive Limit, 4-33
    TCP KeepAlive, 4-33
AT&T 54016, 6-12
ATM ARE
  default parameters, A-5
  editing line details, 3-47
  parameters
    Clocking Signal Source, 3-51
    Data Path Enable, 3-49
    Data Path Notify Timeout, 3-50
    DS3 Line Build Out, 3-51
    DS3 Scrambling, 3-52
    Enable, 3-49
    Framing Mode, 3-51
    Interface MTU, 3-49
    SVC Inactivity Timeout (Secs), 3-50
    SVC Inactivity Timeout Enable, 3-50
ATM FRE2
  default parameters, A-4
  editing line details, 3-41
  parameters
    Cell Insertion, 3-47
    Data Path Notify, 3-43
    Data Path Notify Timeout, 3-43
    Enable, 3-43
    Framing Mode, 3-46
    Loopback, 3-46
    Scrambling, 3-46
    SVC Inactivity Timeout (Secs), 3-44
    SVC Inactivity Timeout Enable, 3-44
AZ address mode, 6-13

B

B8ZS line coding, 1-14
  configuring, 6-11, 6-40
Bay Networks
  CompuServe forum, xix
  customer support, xviii
  Home Page on World Wide Web, xx
  InfoFACTS service, xx
  publications, ordering, xxi
  Technical Response Center, xx
BERT mode
  MCE1, 5-31 to 5-36
  MCT1, 6-36 to 6-47
bipolar format, 1-13
BOFL (Breath of Life) messages
  Ethernet lines, 3-8
  FDDI lines, 3-16
  HSSI lines, 3-31
  MCE1, 5-21
  MCT1, 6-24
  synchronous lines, 4-4
Breath of Life messages. *See* BOFL
BY address mode, 6-13

C

channels. *See* timeslots
circuits
  MCE1, 5-11, 5-15
  MCT1, 6-16, 6-19
  multiline. *See* Multiline
  type designators, 2-3
claim token process, 1-9
CompuServe, Bay Networks forum on, xix
configuring
  line resource management services, 8-3 to 8-15
  multiline, 7-6 to 7-11
CRM (Circuit Resource Manager)
  defined, 8-2
  line resource record, 8-14
CSMA/CD (Carrier Sense Multiple Access with Collision Detector). *See* Ethernet
customer support. *See* getting help
cyclic redundancy check (CRC), 5-25, 6-28

D

D4 frame, 1-15
DAS, 1-9
DCE, 4-18
default parameters
  Asynchronous line, A-8
  ATM ARE line, A-5
  ATM FRE2 line, A-4
  E1 line, A-1
  Ethernet line, A-1
  FDDI line, A-2 to A-3
  HSSI circuit, A-3
  LAPB, A-7
  Line Resource, A-13
  MCE1 line, A-9 to A-10
  MCT1 line, A-10 to A-13
  Multiline, A-13
  Synchronous line, A-6
  T1 line, A-4
  Token Ring line, A-4
deleting
  line reservations, 8-14
  LRM services, 8-14
DS0 timeslots, 1-15
DS1, 6-11
DSO timeslots. *See* timeslots
DSX1, 6-11
DTE, 4-18
Dual Attachment Station, 1-9

E

E1
- configuring for multiline, 7-1
- default parameters, A-1
- editing line details, 3-2
- overview, 1-17
- parameters
  - Clock Mode, 3-4
  - Enable, 3-3
  - HDB3S Support, 3-4
  - Line Type, 3-3
  - Mini Dacs, 3-5

Echo frames, 1-12

editing line details
- Asynchronous, 4-29
- ATM ARE, 3-47
- ATM FRE2, 3-41
- E1, 3-2
- Ethernet, 3-6
- FDDI, 3-15
- FDDI MAC attributes, 3-24
- FDDI path attributes, 3-25
- FDDI port attributes, 3-28
- FDDI SMT attributes, 3-18
- HSSI, 3-30
- MCE1, 5-20
- MCT1, 6-33
- Synchronous, 4-2
- T1, 3-34
- Token Ring, 3-38

Ethernet
- default parameters, A-1
- editing line details, 3-6
- overview, 1-1
- parameters
  - BOFL Enable, 3-8
  - BOFL Timeout, 3-8
  - Enable, 3-7
  - Hardware Filter, 3-9
  - Interface Line Speed, 3-9
  - Line Advertising Capabilities, 3-12

extended superframe, 1-15
- configuring for MCT1, 6-10, 6-40

F

FDDI
- claim token process, 1-9
- default parameters, A-2
- editing line details, 3-15
  - FDDI MAC attributes, 3-24
  - FDDI path attributes, 3-25
  - FDDI port attributes, 3-28
  - FDDI SMT attributes, 3-18
- overview, 1-6
- parameters
  - BOFL Enable, 3-16
  - BOFL Timeout, 3-16
  - Connection Policy, 3-20
  - Duplicate Address Protocol, 3-23
  - Enable, 3-16
  - Hardware Filter, 3-17
  - LER Alarm, 3-29
  - LER Cutoff, 3-29
  - LLC Data Enable, 3-25
  - Requested TTRT (ms), 3-27
  - Status Report Protocol, 3-23
  - T_Max Lower Bound (ms), 3-27
  - T_Notify Timeout (s), 3-22
  - Trace Max Expiration (ms), 3-22
  - Tvx Lower Bound (ms), 3-26
  - User Data, 3-23
- ring
  - architecture, 1-7
  - maintenance, 1-10
  - node regulation in, 1-10
  - operation, 1-9
  - wrapping, 1-7
- SMT
  - Connection Policy values, 3-21
  - frame class and type, 1-12
  - overview, 1-10

SMT *continued*
standards
MAC, 1-6, 1-7
PHY, 1-6, 1-7
PMD, 1-6
SMT, 1-6, 1-7, 1-10
station timers, 1-10
FDL mode, 6-12
flowspec (flow specification), 8-3

G

getting help
from a Bay Networks Technical Response Center, xx
through CompuServe, xix
through InfoFACTS service, xx
through World Wide Web, xx

H

HDB3 line coding, 5-8, 5-35
HDLC service type, 5-22, 6-26
HSSI
configuring for multiline, 7-1
default parameters, A-3
editing line details, 3-30
parameters
BOFL, 3-31
BOFL Frequency, 3-32
CRC Size, 3-33
Enable, 3-31
External Clock Speed, 3-33
MTU, 3-32
Transmission Interface, 3-33
WAN Protocol, 3-32

I

InfoFACTS service, xx
interframe time-fill pattern, 5-25, 6-28

K

KG84A, 4-19 to 4-22
cryptographic device, 4-7

L

LAN
Ethernet, 1-1
FDDI, 1-6
Token Ring, 1-5
LAPB
default parameters, A-7
description, 4-23
parameters
Command/Response Address, 4-28
Control Field, 4-25
Enable, 4-24
Enable Rx/Tx of XID Frames, 4-28
Idle RR Frames, 4-28
Initiate Link Setup Action, 4-27
Max N1 Frame Size (octets), 4-25
Max N2 Retries, 4-26
Max T1 Acknowledge Timer (seconds), 4-26
Max T2 Acknowledge Timer (seconds), 4-27
Max T3 Disconnect Timer (seconds), 4-27
Station Type, 4-25
WAN Protocol, 4-29
Window Size, 4-26
line coding
MCE1, 5-8, 5-35
MCT1, 6-11, 6-40
line resource default parameters, A-13
Line Resource Manager (LRM)
disabling, 8-14
enabling, 8-3
overview, 8-2
parameters
Bandwidth Interval (Secs), 8-8
Estimated Bandwidth, 8-6
Inflate Reservations Percentage, 8-9

Line Resource Manager (LRM) *continued*
Multiline Select Algorithm, 8-10
Multiline Threshold Bandwidth, 8-11
Policing Algorithm, 8-8
Reservable Bandwidth, 8-7
Reservation Latency, 8-11
Traffic Queuing Algorithm, 8-7
Unreserved Policing Algorithm, 8-9
Unreserved Queue Length, 8-10
line service parameters, accessing, 2-1
line speed, Ethernet, 3-12
line tests
MCE1, 5-31 to 5-36
MCT1, 6-36 to 6-47
Link Access Procedure Balanced (LAPB) protocol. *See* LAPB
LLC1 (HDLC service type), 5-22, 6-26
loopback, 5-22, 6-13

M

MCE1
BERT mode, 5-31 to 5-36
default parameters, A-9 to A-10
defining circuits, 5-11, 5-15
line coding, 5-35
logical lines, 5-14
multiline groupings, 5-15
parameters
BERT Mode Enable, 5-33
BERT Send Alarm, 5-34
BERT Test Pattern, 5-34
BOFL Timeout (seconds), 5-21
Breath of Life (BOFL) Enable/Disable, 5-21
Clear Alarm Threshold (seconds), 5-9
CRC Size, 5-25
Enable/Disable, 5-8, 5-21
Fractional Loopback, 5-22
Interframe Time Fill Character, 5-25
International Bit, 5-9, 5-34
Line Coding, 5-8, 5-35
MCE1 *continued*
Line Impedance, 5-10
Line Type, 5-8, 5-35
Local HDLC Address, 5-23
MTU Size, 5-25, 5-31
Port Application Mode, 5-6
Primary Clock, 5-4
Rate Adaptation, 5-24
Remote HDLC Address, 5-24
Secondary Clock, 5-4
Service, 5-22
Setup Alarm Threshold (seconds), 5-9
WAN Protocol, 5-22
testing the line, 5-31 to 5-36
timeslots, 5-26, 5-30
MCT1
BERT mode, 6-36 to 6-47
default parameters, A-10 to A-13
defining circuits, 6-16, 6-19
line coding, 6-40
logical lines, 6-18
multiline groupings, 6-19
parameters
Accept Loopback Request, 6-13
BERT Mode Enable, 6-38
BERT Send Alarm, 6-39
BERT Test Pattern, 6-39
BOFL Timeout (seconds), 6-25
Breath of Life (BOFL) Enable/Disable, 6-24
Clear Alarm Threshold (seconds), 6-12
CRC Size, 6-28
Enable/Disable, 6-10, 6-24
FDL Configuration, 6-12
Fractional Loopback, 6-25
Interframe Time Fill Character, 6-28
Line Coding, 6-11, 6-40
Line Resources, 6-30
Line Type, 6-10, 6-40
Local HDLC Address, 6-26
Loopback Configuration, 6-13
MTU Size (bytes), 6-28, 6-35
Port Application Mode, 6-6
Primary Clock, 6-4

MCT1 *continued*
Rate Adaptation, 6-27
Remote FDL HDLC Address Mode, 6-13
Remote HDLC Address, 6-27
Remote Loopback Detection, 6-29
Secondary Clock, 6-4
Service, 6-26
Setup Alarm Threshold (seconds), 6-12
Signal Level, 6-41
Signal Level (dB), 6-11
WAN Protocol, 6-25
testing the line, 6-36 to 6-47
timeslots, 6-30, 6-34
Multiline
circuit types, 7-2
configuring
MCE1, 5-15 to 5-20
MCT1, 6-19 to 6-23
synchronous lines, 7-6, 7-8
default parameters, A-13
grouping data paths, 7-3, 7-8
media support, 7-1
overview, 7-1
parameters
Data Path Chooser, 7-11
traffic distribution methods, 7-4

N

Neighbor Information frames, 1-12

P

Parameter Management frames, 1-12
power level, T1 transmit, 6-11
primary ring, 1-7
priority queuing, 8-10

Q

QMCT1
parameters
Accept Fractional Loopback Code, 6-30, 6-45
Accept Perf Measurement CR Addr, 6-14
BERT Mode, 6-29
BERT Mode Enable, 6-45
BERT Test Pattern, 6-29, 6-45
Primary Clock, 6-7
Secondary Clock, 6-7
Send Performance Measurement CR Addr, 6-14
Quality of Service (QoS), 8-2

R

rate adaptation, line, 5-24, 6-27
Request Denied frames, 1-12

S

SAS, 1-9
secondary ring, 1-7
service type, 5-22, 6-26
Single Attachment Station, 1-9
SMT. *See* FDDI SMT
ST2 protocol, 8-2
station management (SMT), 1-11
See also FDDI SMT
Status Information frames, 1-12
Status Report frames, 1-12
Synchronous
configuring for multiline, 7-1
default parameters, A-6
editing line details, 4-2
parameters
BOFL, 4-4
BOFL Timeout, 4-4
Burst Count, 4-8

Synchronous *continued*
Cable Type, 4-16
Clock Source, 4-5
CRC Size, 4-13
Enable, 4-3
Extended Address, 4-17
Extended Control (S and I frames), 4-15
External Clock Speed, 4-6
Idle RR Frames, 4-16
Internal Clock Speed, 4-6
KG84A Cycle, 4-21
KG84A Remote Resync Wait, 4-22
KG84A Sync Loss Interval, 4-21
KG84A Sync Pulse, 4-22
Link Idle Timer, 4-15
Local Address, 4-10
Minimum Frame Spacing, 4-9
MTU, 4-5
Network Link Level, 4-14
Pass Thru Local Address, 4-12
Pass Thru Remote Address, 4-12
Promiscuous, 4-5
Remote Address, 4-11
Remote Loopback Detection, 4-17
Retry Count, 4-15
Retry Timer, 4-16
RTS Enable, 4-7
Service, 4-8
Signal Mode, 4-7
Sync B Channel Override, 4-18
Sync Hold Down Time, 4-17
Sync Line Coding, 4-14
Sync Media Type, 4-13
Sync Polling, 4-13
Sync Priority, 4-18
Transmit Window Size, 4-9
WAN Protocol, 4-11

T

T1
configuring for multiline, 7-1
default parameters, A-4
editing line details, 3-34
frame format, 1-15
overview, 1-13
parameters
B8ZS Support, 3-35
Clock Mode, 3-36
Enable, 3-35
Frame Type, 3-35
Line Buildout, 3-36
Mini Dacs, 3-37
signals, 1-13
synchronization, 1-14
timed-token protocol, 1-9
time-fill pattern, interframe, 5-25, 6-28
timeslots, 1-15
MCE1, 5-26, 5-30
MCT1, 6-30, 6-34
Token Ring
default parameters, A-4
editing line details, 3-38
overview, 1-5
parameters
Early Token Release, 3-40
Enable, 3-39
MAC Address Override, 3-39
MAC Address Select, 3-40
Speed, 3-40
token rotation timer, 1-10
token-holding timer, 1-10
TTP (timed-token protocol), 1-9

V

valid transmission timer, 1-10

W

WAN protocols, 1-18
World Wide Web, Bay Networks Home Page on, xx
wrapping (FDDI), 1-7